

The Commercial Car Journal

VOLUME X

PHILADELPHIA, NOVEMBER 15, 1915

NUMBER 3

FOUR S. A. E. "SAFETY FIRST" MEASURES ADOPTED BY NATIONAL CONVENTION

One of the keynotes of the first annual convention of the Safety First federation held in Detroit recently, was struck by E. W. Zimmerschied, member of the Detroit section and chairman of the Standards Committee of the Society of Automobile Engineers, who, as a delegate of the Society, proposed four regulations for greater motor car safety, all of which were adopted.

These regulations covered:

Standard license plates and methods of attaching them; Standard gear shift gates or progression; Standard location for engine and car numbers, and Anti-glaring provision for head lights.

Mr. Zimmerschied in his talk before the Safety First advocates pointed out the things that have been accomplished by automobile engineers in making motor cars safer for the driver to operate, for drivers of other cars and for pedestrians.

ENGLAND EXEMPTS AMERICAN TRUCKS

The order of the Chancellor of the Exchequer McKenna, imposing an import duty of 33 1-3 per cent. on all foreign cars has been modified so as to exempt trucks and truck parts. This was brought about by a storm of protest from Englishmen who have learned the value of the American truck. American trucks have been of great advantage to the English armies, and to the merchants whose trucks have been commandeered for the army.

WILL FINANCE BUYING OF MOTOR TRUCKS

The Acceptance Corp., of 55 Liberty Street, New York City, has opened a new department for the purchase of notes taken in part payment for motor trucks. By this plan the truck dealer can now accept notes in part payment for a truck which the corporation agrees to buy from him, and thus the dealer can pay the truck manufacturer cash for his product and permits the dealer to get the concessions, discounts and freight allowances usually made to cash customers. It will also relieve him of the bother of collecting the notes from the customer or financing any part of the transaction.

The company includes on its board of directors many well-known bankers and men of prominence in the automobile industry, including R. M. Owen, Roy A. Rainey, Robert H. Montgomery, Henry Bennett Leary, John Farson, Richard H. Swartout, E. D. Bird and David B. Mills.

Table of Contents

	PAGE
Accessories and Appliances.....	31
Advertisers' Index.....	123
Analysis of a Baking Company's Motor Delivery Service.....	26
Auxiliary Devices as Used by Some of Buffalo's Motor Truck Users—By Geo. W. Grupp.....	44
B. A. Gramm's New 5 to 6 Ton Truck Has Worm Drive.....	22
Buick Has Overhead Valve Engine and Full Electric Equipment.....	19
Cartoon of Sales Managers.....	16
Commercial Car Efficiency Increased by Auxiliary Equipment.....	13
Editorials.....	9
E. V. A. May Merge With National Light Association.....	8
Factory News and Changes.....	5
Foreign News.....	35
GMC Worm and Chain Drive Chasses.....	21
How Montgomery, Ward & Company Handle 150,000 Packages a Day—By Chas. P. Root.....	34
Industrial Trucks in The Service of the Pennsylvania Railroad.....	39
Motor Truck Design and Construction Made Plain—By C. T. Schaefer.....	27
Motor Truck Replaces Trolley Mail Cars in Boston—By J. J. Sullivan.....	48
National Accessory and Jobbers' Association Defines the Term Jobber—By W. D. Meng.....	7
New Incorporations.....	5
Packard Changes to Worm Drive and Brings Out a New One-Ton Model.....	17
Personal Items.....	5
Ruggedness of the Edison Storage Battery.....	38
S. A. E. Mid-Western Section Formed—By Herbert L. Connell.....	11
Standard Two-Ton Truck.....	20
Uninterrupted Truck Service the Result of Cleanliness—By Albert G. Metz.....	23
Utilization of By-Products Reduces Cost of Operation of Electrics in Laundry—By A. Jackson Marshall.....	37

DESIRES AGENCY FOR AMERICAN AUTOMOBILE ACCESSORIES

The Holland-Java Export Co., Amsterdam, Holland, desires to act as agent for manufacturers and exporters of American automobile accessories. These people desire manufacturers and exporters to forward them catalogs in triplicate, together with rock bottom prices. The company states that it buys everything for its own account, cash against documents in New York or Amsterdam, and manufacturers will probably do well to write at once on this proposition.

Boston is the only city with a show of more than local importance that continues commercial car exhibitions. Department C, of the Fourteenth Annual Boston Automobile Show, which will be held from March 4th to 11th inclusive in the Mechanics Bldg., will be devoted entirely to the exhibition of commercial cars.

GENERAL VEHICLE AND PEERLESS UNITE

The Peerless Truck and Motor Corporation has just been organized to take over the business and properties of the Peerless Motor Car Co., Inc., of Cleveland, Ohio, and the General Vehicle Co., of Long Island City, N. Y. By this move two large companies engaged in the manufacture of motor trucks, of both the gasoline and electrical type, aeroplane motors and gasoline motors are merged. Both companies are exporting many trucks, aeroplane motors and ammunition parts for war purposes. It is said the General Vehicle Co. has been controlled by the General Electric Co. Manufacturing facilities are being increased at the plants of both of the merging companies to enable them to take a still larger share in this export business. In addition, both concerns have an extensive domestic business. The General Vehicle Co. controls the exclusive rights for the United States for the aeroplane motors of the Daimler Motoren Gesellschaft of Stuttgart and Berlin, and it is proposed to develop this end of the business extensively.

MEETINGS OF INDIANA AND MICHIGAN AUTO SERVICE MANAGERS' ASSOCIATION

The Automobile Service Managers' Association, of Michigan, effected a temporary organization at a meeting in Detroit recently when twelve service managers representing a number of leading manufacturers met at the Hotel Statler. The first steps towards the formation of a chain of State organizations were taken. C. R. Lester, of the Packard Motor Car Co.; D. H. Haselton, Regal Motor Car Co., and A. O. Weise, Oakland Motor Car Co., were named as a Committee on Constitution and By-Laws.

The first regular meeting of the Indiana organization was held in Indianapolis on October 9.

President H. W. Drew, service manager of the Nurdyke & Marmon Co., in his address called attention to the bugaboo of free service, and its detrimental effects, and made a strong plea for a reform in the character of the service to be given. Incidentally, he suggested an organization of service managers to handle the service problem, stating that he believed these men were more likely to get in touch with the details than the executives. As the prime objects of the organization, he named, first, grappling with the service problem with users; second, improving the garage-men's departments by interchange of ideas; third, forming of valuable personal and business friendships. He also spoke of a campaign of public education through advertising media as containing wonderful possibilities.

TECHNOLOGY INSTITUTE MAKES REPORT ON TRUCK V.S. HORSE EFFICIENCY

In the final report made by the electrical engineering department of the Massachusetts Institute of Technology, on the relative efficiency of hauling by commercial cars vs. horse transportation in city hauling, H. F. Thomson, head of the investigation, concludes that for heavy work the gasoline truck is cheaper than the horse-drawn wagon for hauls of more than 3 miles. Within a radius of 6 miles the electric truck is more economical than either of its competitors, but that it practically is limited to a daily mileage of 32 miles, which is the limit of work on a single charge of the battery.

In parcel delivery work, with frequent stops, the gasoline car shows great economy over the horse and the electric, where the mileage is more than 42 miles a day, at which the practicable operation of the latter vehicle ceases. The estimated costs of delivery of the three types of transportation are: Within a radius of 4 miles, for electric truck, $5\frac{3}{4}$ cents per package; horse wagon, $5\frac{3}{4}$ cents; gasoline truck, $6\frac{1}{3}$ cents. Within a 10-mile radius, electric car, $7\frac{1}{2}$ cents per package; horse vehicle, $7\frac{3}{4}$ cents; gasoline car, $8\frac{1}{4}$ cents. Over the 10-mile radius, the relative advantage of the gasoline truck over the horse is in increasing measure with added distance from distribution center. Figures for parcel post delivery at a 12-mile radius according to Mr. Thomson's figures are: For horse wagon, 12 cents per package, and for gas car, $10\frac{3}{4}$ cents.

An interesting point brought out by the investigation is the relative small increase in the operating cost of a gasoline car, due to a rise in the price of gasoline. The cost of fuel is said to range only from 6 to 10 per cent. of the entire cost of operating commercial cars. In parcel delivery work, labor costs 36 per cent. of the total in long-haul work, and 63 per cent. in the short haul.

The following suggestions are offered for the more successful operation of commercial cars:

1. The work of a truck should be routed with a view to avoiding idle standing time and retracing.
2. Commercial cars should be kept in motion, they represent greater earning power than a horse outfit.
3. The mechanism of the car should be inspected at least once every two weeks and a written report submitted to the superintendent.
4. A truck should be overhauled yearly, and worn parts replaced.
5. Over-speeding and over-loading should be prohibited.
6. The driver's interest in the car's condition and performance should be stimulated.
7. Accurate cost and performance records of each truck should be kept.

RUSSELL HUFF LEAVES PACKARD

Russell Huff, who has been affiliated with the Packard Motor Car Co., since its inception, has resigned as consulting engineer to accept the position of chief engineer for Dodge Bros., Detroit. He designed the first Packard produced by J. W. Packard, at the Warren, Ohio, plant.

NATIONAL FOREIGN TRADE COUNCIL TO MEET IN NEW ORLEANS

The Third National Foreign Trade Convention has been called by the National Foreign Trade Council to meet in New Orleans, Thursday, Friday and Saturday, January 27, 28 and 29, 1916. "Commercial Preparedness" will be its motto.

All Americans engaged in or desirous of entering oversea commerce, and particularly all boards of trade, chambers of commerce and other commercial and industrial organizations, are invited to participate in this practical and constructive discussion of policies and practices necessary to meet the keener competition which the United States may expect to encounter in world markets after the war.

Formal invitations will shortly be issued to Boards of Trade, Chambers of Commerce and other commercial and industrial organizations, corporations firms and individuals interested in the development of oversea trade.

DETROIT SECTION S. A. E. DISCUSSES PISTON DESIGN

The main feature of the regular meeting of the Detroit Section of the Society of Automobile Engineers, held on the evening of November 12th, in the Convention Hall of the Hotel Pontchartrain, was a general paper on the subject, "Piston Design and Its Relation to the Cethias Process," by J. E. Diamond.

This paper covered piston design in general, as well as dwelling particularly on alloy pistons and was filled with data of interest to designers and engineers.

The paper of the evening followed a short business session. W. A. Brush and Mason P. Rumney from the Detroit Section were named by chairman George W. Dunham to serve with him as a committee in charge of next summer's annual cruise. The committee is already at work.

DOES NOT THINK ENGLISH DUTY WILL STOP SALE OF AMERICAN TRUCKS

Note: The following answer by our foreign correspondent is to a letter which we recently sent him asking his opinion on this question.—Editor.

To the Editor:

I do not think that the release of certain British trucks for private sale necessarily means any immediate decrease in the sale of American trucks over here. In fact, unless there appeared the unexpected prospect of the war coming to an end soon, I think that American sales are likely to go on for a considerable time, if not till the end of the war, for it must be realized that the demand for transport over here exceeds the supply, and that a portion of the British truck output has only been released to fulfill the needs for transport of government contractors, for the government only released them for sale to approved private firms, and these firms have to be engaged in government contracts. Now that the temporary dislocation caused by the budget (now withdrawn) is over, the prospect for the American trucks over here for the time being seems as good as ever.

L. M. JONES.

London, England.

TRUCKS RECEIVE OFFICIAL RECOGNITION FOR TRANSPORT SERVICE BY U. S. OFFICERS

The Motor Truck Club of America has taken up the subject of military preparedness along the line of commercial car supply with a view to finding out to what extent the present types of equipment are adapted to military service. Three experts who were identified with the Plattsburg forces were guests at an informal dinner given at the regular October meeting of the club, and gave their experiences with motor transport in quartermaster service. The Plattsburg encampment was the first military event in this country to use motor transportation on a large scale. H. B. Clark, under a temporary camp commission of lieutenant, acted as regimental quartermaster during the month's encampment and had command of the entire motor truck equipment. He discussed the work of the trucks pointing out that at no time did they fail to do all that was required of them, even though they were given work more difficult than the regular mule team equipment would have been given. No concessions of any kind as to routes, loads, or other particulars were made to the trucks. Bridges and culverts were a weak point and Mr. Clark was obliged to reinforce them as he went. He was able to make such reinforcements often amounting to complete reconstruction with very little delay and without one failure on account of the discipline and efficient employment of the men assigned to him. He stated that he considered commercial cars as valuable, not as auxiliaries to mule transport but as substitutes; that it was possible for them to negotiate any going that was practicable for mule-drawn wagons, and to do so with less likelihood of failure.

NEW ONE-TON DELIVERY TRUCK

The Houghton Sulky Co., Marion, Ohio, will shortly start the building of 1-ton trucks, which will be designed principally for delivery purposes, and which will be known as the Houghton. The first of these trucks will be on the market about the first of the year. L. R. Wottering is the engineer in charge of the designing department. The truck will be equipped with a four-cylinder engine developing 22 h.p. It will have three speeds forward, and the rear axles will be an improved floating type, and will be especially constructed to take care of overloads. The wheelbase will be no longer than most light trucks. All parts of the truck will be standardized. The retail price has not been fixed.

The Surgeon General of the U. S. Army has appointed a board comprised of Major A. W. Williams, Captain Percy L. Jones, Captain Arthur W. Christie, all of the Medical Corps and on duty in the vicinity of Washington, D. C., to ascertain what type of motor ambulance is the best to adopt for the use of the Medical Department. Various commanding generals have recommended the use of trucks as a means of transportation for this department, and for this reason it was thought best to ascertain the most suitable type for this purpose. Department officials, however, state that this does not mean that there will be a dependence upon motor trucks entirely.

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Factory News and Changes

Wichita Motor Truck Co., Wichita Falls, Tex., is having plans made for a new factory building to be erected in Dallas.

Gemmer Mfg. Co., Detroit, manufacturer of motor vehicle steering gears, is erecting one-story additional building 40x60 ft.

Hess-Bright Mfg. Co., Front and Erie Ave., Philadelphia, Pa., is erecting one-story factory addition 40x60 ft. costing \$3980.

Budd, Edw. G., Mfg. Co., 21st and Hunting Park Ave., Philadelphia, Pa., is erecting one-story steel frame die storage building 15x160 ft. \$3500.

Toledo Machine & Tool Co., Toledo, Ohio, is erecting three-story addition 400x100 ft. costing \$200,000. This will increase the output of the plant 35 per cent.

Parrish & Bingham Co., Cleveland, Ohio, have purchased a ten-acre plot as a site for a new building which will be erected as an additional factory building.

Wallis Tractor Co., Cleveland, Ohio, has moved to Racine, Wis. A large part of the former Racine-Sattley Co.'s works has been leased as a permanent home for the company.

Krebs Commercial Car Co., Clyde, Ohio, has been reorganized under the name of the Clyde Car Co., capitalized at \$25,000. J. W. Flickinger, Albert A. Wott and J. R. Baynes are interested.

Electric Auto-Lite Co., Toledo, Ohio, is erecting 385x103-ft. addition to its Champlain Street plant. It will be a three-story building with provision for the fourth story if future demands require it.

Continental Motor Mfg. Co., Muskegon, Mich., is erecting an additional structure 60x180 ft. on half of a recently purchased site fronting on Muskegon lake. The balance of the site will be reserved for future additions.

Vacuum Oil Co., Rochester, N. Y., is erecting addition to plant costing \$17,000. This will bring the company's expenditure for the year up to \$200,000. It is planned to spend \$500,000 next year for factory expansion.

Studebaker Corp., Detroit, Mich., is enlarging its plant No. 3, and has purchased land in the rear of this plant on Clark Ave., having 283 ft. of frontage on the west side of Campau Street, between W. Fort Street and W. Jefferson Ave.

Kissel Motor Car Co., Hartford, Wis., is erecting the first of a number of additions, which will eventually double its production. One of the new structures is for storage and shipping, one for the enameling department, and a third is to be erected soon, which will be a four-story office building.

Anderson Rolled Gear Co., Cleveland, Ohio, has been taken over by the Shaw-Kendall Engineering Co., Toledo. The Shaw-Kendall Co. will manufacture the patented gear controlled by the Cleveland concern. The Cleveland plant will be moved to Toledo, where 1000 men will be employed within a year.

The Gersix Co., headed by Edw. E. Geringer, has secured a lease on a two-story building formerly occupied by the Pierce-Arrow dealer at E. 3d and Oregon Streets, Portland, Ore. A 2½-ton assembled truck will be produced, selling at \$2500. In addition to assembling trucks, the company will also rebuild and sell used trucks.

Firestone Tire & Rubber Co., Akron, Ohio, has just placed contracts for additional floor space amounting to 110,000 sq. ft., or nearly three acres. This is in addition to the five wings begun last spring, and which are now nearing completion. When the additions above mentioned are completed, the total floor space will cover over thirty-one acres.

Atlas Drop Forge Co., Lansing, Mich., is enlarging its plant in order to meet requirements of increasing business. The proposed expenditure will amount to \$40,000 or \$50,000, and the present force of 140 men will be doubled as soon as the new additions are completed. A 10 per cent. cash dividend was recently declared on the capital stock of \$200,000.

The Detroit Commercial Car Co. will occupy part of the factory of the Pontiac Chassis Co., Pontiac, Mich., which concern is making chassis for the Detroit package delivery wagon. The Detroit Commercial Car Co. is planning to put out 5000 commercial cars the first year. A selling organization is being formed, and within a short time the entire organization will be in full capacity.

Personal Items

L. P. Stevens has become manager of the Chase Motor Truck Sales Co., Chicago, succeeding R. M. Fisher.

T. P. Myers has been made head of the truck sales department of the Packard Motor Car Co., of New York City.

Frederick Liser has become special assistant in the sales work to G. A. Crane, manager of the Chicago branch of the Garford Motor Truck Co.

Orin S. Wilson, for the past two years Philadelphia agent for the Studebaker car, has sold his interests to a new concern, the name of which has not yet been made known.

J. D. Bowen has become factory representative for the Republic Motor Truck Co., Alma, Mich., to cover Georgia and Florida, with headquarters at 14½ south Laurel Street, Jacksonville, Fla.

J. E. Philpott, formerly superintendent of the truck service department of the Overland Motor Co., Chicago, has accepted a similar position with the Chicago branch of the Garford Motor Truck Co.

C. E. Golder, formerly connected with the Curtis Automobile Co. and the Kissel Motor Car Co., Hartford, Wis., has become assistant manager in charge of sales of the Chicago branch of the Garford Motor Truck Co.

H. C. White, formerly superintendent of the assembling departments of the Pierce-Arrow Motor Car Co., Buffalo, N. Y., has become affiliated with the Curtis Aeroplane Co., of the same city, in the capacity of production engineer.

Bryce E. Blackley, formerly manager of the motor truck department of the J. C. Tucker Co., Providence, R. I., has become division sales manager for the Chase Motor Truck Co. in the New England territory, with headquarters in Providence.

H. B. Voit, formerly purchasing agent for the Oakland Motor Car Co., Pontiac, Mich., has become director of purchases for the Continental Motor Mfg. Co., and will have charge of all purchasing for both the Detroit and Muskegon plants of the company.

S. M. Beatty, formerly manager of the Providence, R. I., branch of the Goodyear Tire & Rubber Co., has been transferred to the sales promotion department of the company at Akron, Ohio. He is succeeded at Providence by E. J. Smith, previously manager of the Hartford, Conn., branch.

Chas. H. Minto has been appointed Pacific coast manager of the Gibney Tire & Rubber Co., Philadelphia. His headquarters will be a factory branch and will be located in San Francisco. Mr. Minto was at one time Pacific coast manager for Hartford tires, and for four years assistant to Chas. A. Gilbert, when the latter was Pacific coast general sales manager for the United States Rubber Co.

New Incorporations

Oldsmobile Co., Spokane, Wash., has taken the agency for the Denby line for the Inland Empire.

Linscott Motor Co., agent for Reo pleasure cars and trucks, moved to 566 Commonwealth Ave., Boston, Mass.

Killian Roller Bearing Corp., Dover, Del., has been organized to manufacture roller bearings with capital stock of \$3,000,000 by H. E. Latter, H. P. Coffin and C. M. Egner.

Tower Motor Truck Co., Greenville, Mich., in bringing out a new truck, the first model of which was recently finished in the machine shop of R. J. Tower. It has a Continental four-cylinder engine, cast in block, 135-in. wheelbase, Timken axles and other standard parts.

Rochester Trailer Co., East Rochester, N. Y., has been formed for the manufacture of autos, trucks and trailers, with a capitalization of \$25,000. Incorporators: K. Gleason, Pittsford; C. H. Babcock, 22 Berkeley Street, Rochester, and E. E. Keller, 720 Jefferson Ave., Detroit.

Willingham, E. G., & Sons, Atlanta, Ga., is now ready to place the Superior truck on the market. Two models will be built to start with of 1 and 2 ton capacity. The trucks will be internal gear driven with valve-in-the-head engines, having offset crankshafts. The 1-ton model will sell at \$1350, express body costing \$50 additional.

Hayes Motor Truck Wheel Co., St. Johns, Mich., has been formed with a capitalization of \$100,000 for the purpose of making wood wheels for commercial cars. The officers are: C. B. Hayes, president; N. S. Potter, first vice-president; W. C. Morrey, second vice-president and timber manager; A. D. Smith, secretary-treasurer and general manager, and H. J. Keller, superintendent.

Hoosier Auto Parts Co., Muncie, Ind., has been incorporated under the laws of Indiana, with a capitalization of \$100,000, fully paid. The incorporators are George A. Ball, Karl A. Oesterle and Fred J. Lesh, who recently bought in at receivers' sale the plant, stock and business of the B-T-K Gear & Engine Co. The plant is being put into first-class condition for operating, and new machinery is being installed for the manufacture of a line of automobile parts, including steering gears, control sets, clutches, universal joints, etc. A service department will be maintained for supplying repair parts on jobs formerly turned out by the B-T-K Gear & Engine Co., the parts being marked "B-T-K." The Hoosier Auto Parts Co. also has a large and well equipped plating department for turning out fine mechanical plating in nickel, copper and brass.

Penberthy Injector Co., Detroit, manufacturer of the Penberthy Injector, etc., has secured the exclusive rights to manufacture and sell Ball & Ball carburetors in the United States and Canada.

NON-GRAN PLANT TO BE DOUBLED

American Bronze Co., Berwyn, Pa., the makers of the well known Non-Gran bearing bronze, have ordered the erection of an addition to their plant which will about double their output. The addition will be finished in about six weeks and soon after they will catch up with orders so as to make deliveries more promptly. Their business for 1915 is over 100 per cent. ahead of 1914.

PACKARD DIRECTORS REPORT

The Packard Motor Car Co., Detroit, Mich., in its annual report to the directors for the year ending August 31, 1915, calls attention to a number of changes that have taken place during the past year.

During the past few years arrangements have been made and special machinery constructed with a view to increased manufacturing facilities.

Twin Sixes have been designed, constructed and sold in the pleasure car department.

The portion of the report dealing with commercial cars is briefly as follows:

Evolution of Packard Trucks

"During the same period when the pleasure vehicle was taking such strides, the commercial car was itself developing by leaps and bounds, so that it became obvious to us that the complete redesign of Packard trucks, based upon all our engineering experience and based upon elaborate experimental development, was clearly a work necessary to be undertaken.

"Therefore, during the past two years the work of placing our commercial cars in the most satisfactory form has been going forward with the utmost effort. These vehicles were designed in seven different sizes: 1-ton, 1½-ton, 2-ton, 3-ton, 4-ton, 5-ton and 6-ton capacities, to meet the varying demands of the great variety of commercial requirements. The satisfactory comments from our patrons who have now had in use for many months the new Packard chainless type commercial cars has required us to provide additional manufacturing facilities for the commercial cars also.

"In order to satisfy ourselves of the merit of our commercial cars, a loaded 3-ton truck of the new type of construction was sent over the Lincoln Highway from New York City to San Francisco, with results much more satisfactory than the former tests over the Lincoln Highway with the chain drive trucks. The economy of upkeep of the new chainless type of Packard truck in all its changed parts has been abundantly demonstrated to be a great advance over previous costs of motor vehicle transportation. While the road conditions over the Lincoln Highway do not provide as severe a test as two years ago, yet the drive across the country of the loaded 3-ton Packard truck and of the Packard Twin-Six, under the great variety of conditions which prevail along this 3400 mile highway, proved the superiority of these vehicles over any vehicles our Packard staff has ever had experience with."

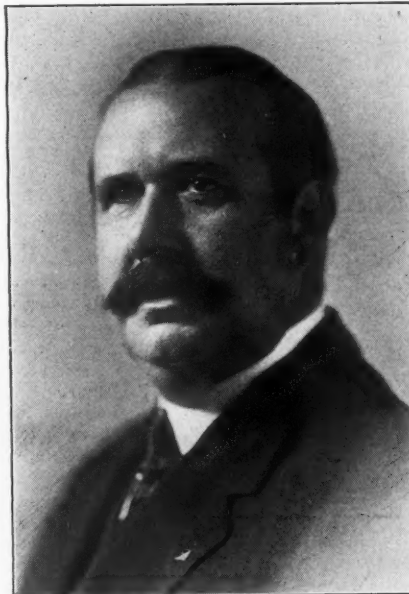
Treasurer's Report

A brief extract of the resources and liabilities of the company is as follows:

Assets:	
Plant—at cost less depreciation	\$7,372,231.17
Investment in branches	1,916,225.16
Inventories	7,423,875.93
Stock option contracts with employees	186,200.00
Investments	1,385,387.50
Current assets	3,435,309.59
Expenses paid in advance	94,924.36
Total	\$21,814,153.71
Liabilities:	
Capital stock—	
Common	\$7,065,300.00
Preferred	5,000,000.00
5% gold debenture notes	3,000,000.00
Deferred payments on real estate	368,985.58
Accounts payable	2,335,907.57
Reserves for general purposes	330,213.34
Surplus	3,713,747.22
Total	\$21,814,153.71

NEW DEPARTURE MANUFACTURING CO. ELECTS OFFICERS

At the recent annual meeting of the board of directors of the New Departure Mfg. Co. DeWitt Page was elected president, Frank P. Furlong, of Hartford, vice-president, C. T. Treadway treasurer and A. C. Hitchcock secretary. The following directors were also elected: DeWitt Page, C. T. Treadway, F. P. Furlong, Charles F. Pope, E. R. Burwell, A. C. Hitchcock, Townsend G. Treadway.



MR. DE WITT PAGE

President of New Departure Manufacturing Company

Mr. Page succeeds Albert F. Rockwell and Mr. Hitchcock succeeds Mr. Page. The new directors are Mr. Hitchcock and Townsend G. Treadway.

Mr. Page, the newly elected president, has been identified with the New Departure Mfg. Co. practically since the very first days of its existence. He came to Bristol from Hartford twenty-three years

ago and accepted a minor position in the office of the then New Departure Bell Co. In the succeeding years he won promotion from one position to another in practically all departments, so that he brings to the presidency an extraordinary and comprehensive knowledge of the business.

About ten years ago he was elected secretary and entered the directorate of the company. Shortly after this the business had grown to such proportions that it was deemed desirable to change the method of marketing the company's product.

Mr. Hitchcock, the newly elected secretary, came to the company six years ago as assistant sales manager and succeeds Mr. Page as secretary and sales manager.

NEW GULF REFINING GASOLINE STATION AT PHILADELPHIA

The Gulf Refining Co., on November 1st, opened a rather novel gasoline and service station at Chestnut and 33rd Streets, Philadelphia. A small artistic tapestry brick and concrete building contains the office with a cashier's desk at the center, and a projecting portico surrounding it protects a circle of Bowser measuring pumps. The entire building is surrounded by a concrete runway of sufficient width for cars to pass, and on the outside edge of this runway is another circle of measuring pumps, there being thirteen pumps and tanks each, of a capacity of 550 gals. Eight khaki uniformed attendants give courteous and prompt service to motorists who desire gasoline, oil, water or air. In the curb, sunk in depressions opposite each pump is an air and water connection with hose, so that it is but a moment's work to apply these free of charge to patrons.

The opening was most successful, over 7000 gallons of gasoline being sold within two days. To patrons upon their first patronizing the station, was presented free of charge 1 gallon of Supreme auto oil, with each purchase of 5 gallons of the highest test Gulf gasoline. This is the first station of this kind in Philadelphia, although the company is now operating two along similar lines in Pittsburgh.



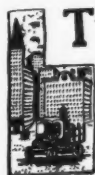
One of the Novelties Seen at the New York Street-Cleaning Show

This apparatus, which was exhibited by the Elgin Street-Sweeper Company, of Elgin, Ill., sprinkles, sweeps and collects. It is a three-wheeled affair, the container and sweeper being located at the rear. The Tiffin Wagon Works, Tiffin, Ohio, exhibited motor-driven power flushers, consisting of regular truck chassis with water tanks mounted on same. The water is under pressure in the tanks. Two Knox tractors, with dumping bodies, were shown, also a stripped chassis. The International Motors Company showed a five-ton chassis.

The CCJ has most advertisers because it gives them biggest returns

National Accessory and Jobbers' Association Defines the Term Jobber

By W. D. MENG



THE mid-year meeting of the National Association of Automobile Accessory Manufacturers and Jobbers was held at Kansas City, Mo., October 20, 21, and 22. The association started with fourteen members a few months ago and opened the present convention with a membership of 103; and Commissioner Webster announced that a new slogan had already been adopted—"200 members." Sessions were presided over by President T. M. Brooks, of Chicago. The most important discussion of the first day was on the question of standardizing the business by establishing a definition for jobbers. The following definition was formally adopted:

"A jobber of automobile accessories is one who buys in bulk or quantity for resale to established retail dealers in accordance with established trade methods. It is required that the major portion of the business be wholesale, and that he maintain sufficient general stock to meet the requirements of his trade."

The members discussed at length the problems of the jobber's business with particular reference to the drawing of lines.

Mr. G. A. Waddle, of the Goodyear Tire and Rubber Co., addressed the association as a representative of the Fair Trade League, outlining the Stevens bill and the association favored it.

W. M. Webster, commissioner of the association, made his report on the work done since the organization. The association decided upon the date of the next meeting as January 7th to 11th.

Other formal reports were made by officers.

The many suggestions taken up by the resolutions were threshed out at the sessions before the resolutions were proposed and they were adopted without much discussion.

The purposes of the convention culminated in addresses by H. R. Williams, manager of sales for the Gibson Co., Indianapolis, and W. K. Norris, president of the McQuay-Norris Mfg. Co., St. Louis, which introduced discussions. Mr. Williams handled the subject which has been particularly close to his heart for the past two years, that of an educational movement. His pertinent suggestion was that jobber's salesmen should be trained and instructed to study the problems of the local garage men with whom they come in contact and assist and encourage them in the improvement of their business.

The address of Mr. Norris was extremely definite and suggestive on the subject of stimulating business during January, February and December. Mr. Norris has studied this subject and has arrived at methods which he has used in his business very successfully. These methods and their results he outlined to the convention. He further suggested the value of a national campaign which would have two phases: to stimulate the customer to purchase during the winter months and

to stimulate the garage men to greater activity during that period. Mr. Norris suggested explicitly a national campaign of advertising to be conducted by the manufacturers to bring before the garage men the possibilities of getting more work in during the ordinary dull season. Such a campaign would need explicit suggestion on the means by which the garage man's trade could be increased and would, by its definite suggestions, point the way to increased business.

T. M. Brooks, of the Automobile Supply Co., of Chicago, is president of the association and S. B. Dean, of Nicol, Dean & Gregg of St. Paul, is vice-president. Wm. M. Webster is commissioner.

The Board of Directors consists of: Charles E. Faeth chairman, Motor and Machinist Supply Co., Kansas City; Wm. L. Ferrier, Fred Campbell, St. Louis; H. P. Andrae, Julius Andrae & Sons Co., Milwaukee and A. R. Thompson, Automobile Supply Co. of Detroit.

The following are some of the important resolutions which were adopted during the convention:

Syndicated Catalogs

We believe the encouragement of the so-called syndicated or stock catalogs, as applying to the automobile accessory line, either in the matter of purchasing catalogs or as an advertiser or contributor by displaying the product in such publications, is inimical to the best interests of this business, a source of great expense to the manufacturer without positive or adequate results or gain and in their use the legitimate jobber loses his individuality, owing to the fact that they are both inexpensive and readily obtained and are oftentimes procured by other than legitimate jobbers, creating a false impression of the proper position of the owner or author in the trade and securing to him trade favors to which his position in the line nowise en-

title him. It thereby works an irreparable injury to the legitimate jobber and we hereby discountenance and disapprove of further encouragement or the patronage of same. Furthermore, no allowance of whatever nature shall be made by the manufacturer to the jobber for cataloging their goods except the manufacturer will furnish standard electrotypes only.

Leagues

We go on record as discountenancing the sale of materials to mail order houses and the so-called motor leagues.

Branch Houses

It was the consensus of opinion of the directors that where a member is maintaining one or more branch houses under the same name as the parent firm and the same ownership, such branches will be considered as members under the original application and it will not be required of them to take out separate membership.

Badge

That the commissioner be authorized to secure a proper and appropriate form of seal as an insignia of the association, to be gotten up in the shape of electrotypes and furnished such members as may desire them, and to prepare a proper badge or pin without ribbon which will be used hereafter as the standard badge, entitling members to admission to the meetings of the association.

Purchasing Agencies

That it is the feeling of the association that there is no field for syndicate purchasing agencies.

Association Selling

That members and associate members discountenance and will not sell to any garage, repair shop or dealer in automobile supplies at a better price than they are selling to general customers, owing to the fact of that dealer, garage or repair man being a member of any association or organization.



Truck Signboard Changed Every Sixty Days

The above illustrates an illuminated signboard erected by the Commerce Motor Car Company, Detroit, Mich., on which is displayed a full-sized picture of the truck of some one of the local Detroit purchasers. Every sixty days a new truck is painted in. This company is advertising and making prominent in this way its new slogan, "The Commerce is a Winner in its Own Home Town."

The CCJ leads in circulation, advertising and prestige

THE E. V. A. MAY MERGE WITH NATIONAL LIGHT ASSOCIATION



AS the result of proceedings at the sixth annual convention of the Electric Vehicle Association, which closed Tuesday night, October 19th, at the Hotel Statler, Cleveland, Ohio, the Electric Vehicle Association of America may affiliate with the National Electric Light Association, an organization of more than 15,000 members.

E. W. Lloyd, president of the latter association, was the guest of the convention on Tuesday and extended a formal invitation to the vehicle men to join the larger body. Mr. Lloyd pointed out the benefits to be derived because of the strength and standing of the association he represents. Sentiment among the members of the E.V.A. is favorable to the affiliation plan, but the matter will be left in the hands of the Executive Committee. The vehicle men have 1550 members.

Speakers at the banquet which closed the convention were Samuel Scovil, president of the Cleveland Electric Illuminating Co.; W. W. Freeman, president of the Union Gas & Electric Co., of Cincinnati, Ohio; Frank W. Smith, of New York City; John F. Gilchrist, of Chicago, Ill., retiring president of the vehicle association, and Walter H. Johnson, of Philadelphia, newly-elected president.

Officers elected Tuesday, besides Mr. Johnson, were E. S. Mansfield, of Boston, Mass., vice-president, and W. H. Blood, Jr., of Boston, Mass.; G. H. Kelly, of Cleveland, Ohio; P. D. Wagoner and Mr. Gilchrist, directors. H. M. Edwards, of New York City, was re-elected treasurer, and A. Jackson Marshall, of New York City, secretary.

The feature of the closing business session was an address by Willis M. Thayer, of Hartford, Conn., on the experience of the Hartford Electric Light Co. in operating a battery exchange system for electric

vehicles. This address was printed in our October issue, page 50.

Talk on Electric Taxicabs

The paper by I. S. Scrimger on the subject of electric taxicabs as used by the Detroit Taxicab & Transfer Co., showed the undoubted advantages of the electric vehicle for taxicab work. The reason assigned by the author of the paper for installing taxicabs of electric type was that they wished to reduce if possible the cost of operation and maintenance, below the \$.30 to \$.35 per mile which had been shown to be the cost with gasoline vehicles.

The first car, which they built themselves, owing to the fact that the electric car makers insisted on their using stock pleasure car chassis, was put in service at the Hotel Pontchartrain, June 25, 1914. No advertising was done, nor anything said as to the new vehicle. Very soon they began to receive letters of approval, and the cab met with most unexpected success.

Similar cabs were then built and put in service last December and January, and the company has just completed fifteen additional cabs, and twenty more are being constructed. It is expected that there will be in service forty-seven electric cabs by January 1st.

Cabs Operate Twenty-four Hours a Day

The cabs are in continuous service for twenty-four hours each day, with two sets of drivers. For convenient charging and to make the twenty-four hour service possible, charging plugs have been placed at the curb of the Hotels Statler, Tuller, Griswold House, and the Pontchartrain so that the cars can be charged while standing idle.

Cab Details

The cab has a 121-in. wheelbase. The interior has a space about 68 in. long and about 50 in. wide, which enables it to carry from four to five passengers very comfortably. Their experience taught them that the limousine type of body was preferable to the landaulet type, and could be

operated with less expense. The Silver-town Goodrich pneumatic tires have made a wonderful mileage showing.

In conclusion, he said, "Our operating cost per mile up to the present time has not exceeded \$.20 a mile. This cost includes drivers' wages, overhead, tire expense, garage expense, depreciation and every expense in fact which is incidental to the operation of the taxicab business. The only point on which we are uncertain is the life of the car. We feel that the car has been so well made that we may be able to depreciate this car over a period of ten years. This of course, is a problem which time alone will tell whether or not we are correct."

ELECTRIC AUTO COMPLETES RUN OF 733 MILES

The longest cross-country run ever made by an electric commercial car was recently completed by a Ward stock delivery car between New York City and Cleveland, Ohio. This test run was made under the auspices of The New York Electric Ve-



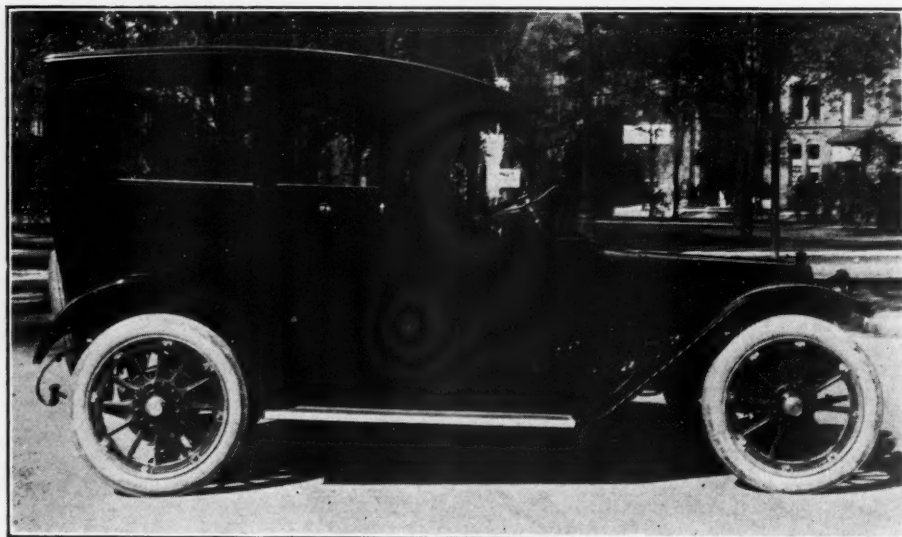
Ward Electric Runs 733 Miles
Completes journey from New York City to Cleveland, in 11 days

hicle Association and the latest type of storage battery invented by Thomas A. Edison was used. The car was started from New York on the afternoon of October 6 in connection with the opening ceremonies of the Electrical Exposition and Motor Show, the driver bearing a letter from Arthur Williams, president of the Exposition to Cleveland's Mayor. During the exposition, which lasted ten days, bulletins told of the successful progress of the car. On Wednesday, October 13, it passed through Buffalo and on Saturday evening, October 16, the closing night of the exposition, a telegram came which stated the electric would arrive in Cleveland the following morning. On Sunday, October 17, just eleven days after the start the car entered Cleveland, having covered a distance of 733.7 miles.

According to John F. Delahant, of The New York Electric Vehicle Association, who accompanied the car as official observer, the run was made without a mishap or without an adjustment being made on the car. The total running time was 84 hours and 43 minutes, the average running time was 8½ m.p.h.

Twenty-five charges of battery were necessary for the entire 733.7 miles, the total current consumption being 1564 hours.

Baker, R. & L., Co., Cleveland, Ohio, elected the following to fill vacancies in the directorate: J. H. Wade, W. J. Mather, D. Z. Norton, J. H. Kling and C. L. F. Wieber, Jr.



Electric Taxicab Which Has Reduced Operating Costs Thirty-Three and a Third Per Cent

This is the type of cab used by the Detroit Taxicab & Transfer Company. It operates twenty-four hours a day, at a cost of twenty cents a mile, including all expenses, driver's wages, etc. Charging plugs are arranged at hotel curbs where the cabs stand.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

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Sworn to and subscribed before me this 18th day of September, 1915.

(Signed) GEORGE H. SHEVLIN, Notary Public.

(SEAL)

(My commission expires April 1, 1917.)

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RAILROAD FREIGHT TERMINALS AND WHARVES SHOULD BE PROVIDED WITH SUITABLE EQUIPMENT TO KEEP PACE WITH TRUCKS



TRANSPORTATION methods have advanced to the point where efficient trucks capable of rapid action are accepted by the business world as necessary for modern delivery. The truck equipment naturally falls into a class by itself, and is separated from the horse delivery in nearly every detail by the owner. A different type of man is in charge, and very often an entirely separate accounting is kept of cost of operation, a special building for garaging the motor driven vehicles is provided; in fact, the delivery methods of the firm are changed materially to suit the new vehicles. Everything within the business that can be changed to facilitate delivery is being changed, buildings are being reconstructed, auxiliary devices of all kinds are being installed, and every effort is made to supply the material at a speed in keeping with the delivery possibilities of the cars. The trucks have accelerated every department of many lines of business, and everything has been speeded up to motor delivery pitch.

On the outside, however, a peculiar state of affairs now exists at railroad stations, freight terminals, and other congested loading and unloading points. Here the trucks are in contact with those unprogressive spirits who have not yet seen the light of modern methods, and at railroad and freight stations, at the docks, and at most of the freight discharging and receiving points, the truck is held up, kept back, and prevented from accomplishing what it is able to do by a long line of slow, plodding horses. In other words, no special provisions have as yet been made at these most essential points to take care of the up-to-date delivery methods of our progressive merchants. The truck is treated exactly the same as the slowest boneyard of a horse that shambles up to the freight station.

Hours are lost by trucks waiting on account of slower moving vehicles. The conditions have become so acute that truck users who appreciate the possibilities of their vehicles and the value of keeping them moving, hesitate to send them to the railroad or freight station, because of the inevitable tie-up of the vehicle which follows.

Special provisions for fast moving vehicles that can get up to the platform and get unloaded, and get out again, should be made by railroads and dock companies. The trucks are the express trains of the delivery service and as such should be given right of way wherever and whenever possible, or their usefulness is annulled. On the railroad, the slow moving freight trains are run on a siding to make way for fast mail or passenger trains. The truck bears exactly the same relation to the horse drawn vehicle, and provision should be made so that its efficiency will tell. Separate gates or platforms, mechanical devices for handling removable bodies, etc., should be provided. The time must surely come when trucks are sufficiently numerous to warrant special and adequate provision for their loading and unloading at these congested terminals.

That some of the railroads already appreciate this, is shown by the introduction at Broad Street Station, Philadelphia, of overhead cranes for the removal of demountable truck bodies, and the same system is now being installed in Baltimore at one of the terminals, where a company using a large number of demountable truck bodies delivers its goods. True, both of these installations are being paid for by the business firms using the vehicles, and not by the railroad, but nevertheless it shows that the railroad officials appreciate the

The CCJ has most readers because it gives most information

New Mid-Western Section of S.A.E. Formed

By HERBERT L. CONNELL



FORMING a new section of the S.A.E. was the big work which was accomplished at Chicago on October 14th in connection with the quarterly meeting of the Standards Committee. In fact, it was for this purpose that the committee held its conference in Chicago instead of at its headquarters in Detroit, Mich., and the dinner at the Chicago Automobile Club was attended by seventy-four engineers interested in the new project. For some time back there has been talk of a Chicago section similar to those at Detroit, New York, Indianapolis and Cleveland, and this was brought to a reality by the carrying of two motions by Herbert L. Connell, of the Milwaukee Continuation School—one creating the branch and the other giving it the name Mid-Western Section. This name implies more than would Chicago, for the members will be drawn from Indiana, Illinois and Wisconsin.

A temporary organization was also created, made up of the following men: Chairman, Wm. H. VanDervoort, president of the Moline Automobile Co., and president of the S.A.E.; vice-chairman, Marcus A. Smith, Standard Oil Co.; treasurer, Prof. Daniel Roesch, Armour Institute, and secretary, Darwin S. Hatch, Editor Motor Age.

A feature of the meeting was the talk by K. W. Zimmerschied, chairman of the Standard's Committee, on the value of standards in the manufacture of automobiles. He said: "The most potent single factor in the brilliant rise of the mechanical industry of America is the almost universal adoption of the principles of interchangeable manufacture—the masterly yet simple provision that all automatically produced parts should be so alike as to be perfectly interchangeable from one assembly to another. It is evident that the whole scheme of interchangeable manufacture is based upon the use, conscious or not, of standards."

He spoke of the various automobile standards such as form, concerning threads, yoke and rod ends, flanges, broaches and taper fittings, housings, etc. Also standards of material such as standardizations of high-grade alloy steels. He mentioned, as a result of this standardization, that these steels are now sold competitively to specification instead of at fancy prices under trade names.

He pointed out the economies due to standardization of inter-factory products. This results in a saving in the drafting room and in the machine shop. Purchasing agents are more likely to buy and to find S.A.E. standard products right at hand and at lower prices.

Concentration on a comparatively few standard types makes available to parts manufacturers the well-known economies of quantity production.

Even in selling the finished product close adherence to S.A.E. standards makes it easier to sell, as this adherence gives a feeling of confidence to the purchaser, and

much useless argument and explanation is avoided. He closed his talk by a resumé of the great importance of the standardization work of the society to the industry at large.

Other speakers were: David Beecroft, Herbert L. Connell, formerly secretary and treasurer of the Detroit Section; Prof. P. B. Woodworth, Louis Institute; N. B. Pope and W. B. Kennedy, of the Metropolitan Section; Geo. W. Dunham and W. H. Conant, chairman and secretary, respectively, of the Detroit Section, and Russel Huff, the next president of the S.A.E. It was proposed to hold not more than four meetings a year.

Standards Committee Meeting

On the morning of the same day the Standards Committee held a session with forty-six members present, and in the afternoon the engineers were the guests of the Standard Oil Co. at its Whiting (Ind.) plant.

First on the program in the morning session was the report of Chairman Zimmerschied dealing with the work of the Iron and Steel Division. It is proposed to increase the limits for sulphur and phosphorus to .054 and .045, respectively, the present figures being .045 and .04, the very special steels for ball races, etc., not being included in the S.A.E. specifications. Another part of the work in hand is the adaptation to automobile practice so far as possible, of the test specifications of the American Society for Testing Materials. In this relation new data sheets will be issued on the flat strip, 2 in. and gray iron test pieces, and on the method of conducting the Brinnell test for hardness.

A lengthy report was submitted by Chairman John G. Utz, of the Miscellaneous Division, which, among other things, showed that considerable progress had been made in the matter of a standard for license plates and holders. It is thought that the authorities can be induced to keep the dimensions within reasonable limits and to agree on the placing of the attachment holes. The light is placed above and in the center, which is considered the best practice by the committee.

Identification Number—Location

Identification numbers for both the chassis and the engine have also received attention, it being recommended that the former be stamped in $\frac{1}{4}$ in. figures on the outside of the frame side rail, as near the front end as possible, and that the latter be marked on the top of the crankcase as far front and near the middle as can be done.

As to the definition of car weight, this has been made to mean the actual scale weight of the car with all catalog equipment and without fuel and water.

Such subjects as V-belts and pulleys for fan drives, clutch facings and speedometer drive connections, which has been before the Miscellaneous Committee, will undoubtedly be turned over to the newly formed Motor and Transmission Division. The

matter of the depth of piston ring grooves is progressing and the division expects to report on this at the winter meeting, the other dimensions for the rings and grooves having been accepted by the society last summer. A special committee will be appointed to deal with the subject of hydrocarbons, the Miscellaneous Division feeling that it has not the expert knowledge necessary to handle this highly specialized subject.

The Ball and Roller Bearing, Pleasure Car Wheel, Research and International Standards Divisions were all reported as progressing with the work they have on hand. Besides the subject of tap drill sizes, the Research Committee has just been assigned the matter of formulating a standard method for the carrying on of car acceleration tests. Relative to the adoption of international standards for solid tires the outlook seems very bright for several European societies and Government branches have offered aid, which will greatly reduce the educational work on the subject which was at first thought would be necessary. Although it will be a number of years before standards in roller bearing sizes can even be hoped for, the division handling the matter has already made considerable progress and a large amount of data is being gathered.

Branding solid tires with their millimeter dimensions will not be recommended according to the report of the Truck Standards Division read by its chairman, W. P. Kennedy. The committee, however, is getting out a new data sheet, which will give the millimeter equivalents of the standard truck tire sizes. A special committee has made a long report to this division on the subject of industrial warehouse trucks, but the division feels that this branch of the industry has not progressed far enough to make general standards feasible at this time, and it, therefore, has made recommendations only on the subject of wheel sizes. Because of the great variety of work to which these midget trucks are being put it has been impossible to cut down the wheel sizes below five, as follows: 10, 16, 20, 22, and 27 in.

A very detailed report was also read by W. M. Newkirk, of the Springs Division, which dealt almost entirely with the tests which the buyer might make on all kinds of leaf springs for pleasure cars and trucks. Several sketches were submitted to show just how each type of spring should be mounted in the testing machine and how the measurements should be taken. Considerable discussion resulted on the subject of placing the maker's and inspector's marks. All agreed that the stamping of numbers in the leaves weakened them and that although it is necessary to make some marks for identification, these should be as few as possible.

Standard dimensions for bell housings were recommended and were later adopted by the letter vote of the society. These drawings showed only the bell housing around a flywheel intended for a disc

clutch. Chairman Zimmerschied, presented a second drawing, showing the cone clutch installation, which does not vary from the one already accepted so far as the bell housing details are concerned, but only in the dimensions required for the extension of the crankshaft for carrying the clutch cone.

Walter T. Fishliegh read the report of the newly formed Motor and Transmission

Division, which was one of organization and progress. Among the points which will be taken up by this committee are the design of poppet valves, V-belts and pulleys as to widths, slippage tests, and V-angles, the interchangeability of hand-starting cranks for different cars, and the collection of characteristic curves of engines.

C. H. Loutrel presented practically the same table for lock washer standards, which was given to the Standards Committee at its summer meeting, but which was not presented to the society at that time. It was voted to submit it to the society at the winter meeting.

Electrical Equipment was dealt with by W. H. Conant, of that division, and the report was one of progress.

Activities of the Motor Truck Association of Philadelphia

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COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

MAYOR URGES AUTO MEN TO ORGANIZE

THE combination of all motor truck organizations and kindred bodies throughout the State for the purpose of securing better roads and beneficial legislation was advocated by Mayor Blankenburg at the regular monthly meeting of the Motor Truck Association of Philadelphia, held on the Roof Garden of the Adelphia Hotel.

The Mayor addressed about two hundred men, including members of the trade, owners of trucks, superintendents of delivery for large concerns using trucks, and representatives of like concerns.

The regular dinner preceded the meeting, after which President E. B. Jackson introduced Mayor Blankenburg, who said he believes that Pennsylvania and Philadelphia road conditions could be vastly improved if the men who sell trucks and those who use them would unite to demand money and its proper expenditure for the building and maintenance of roads.

He cited the defeat of the \$50,000,000 loan for State highways as unfortunate but due to political conditions of the time. "We ought to have the best roads in the country, but we haven't got them. You can compel the legislature to give them to you. The money during the past two years has been spent wisely. But these improved conditions cannot be secured unless you imbue in the Highway Department and Legislature the idea that it is a business proposition and not politics. You can do that if you unite your efforts."

Mr. Jackson then spoke on the object of the Motor Truck Association. He said it was organized to unite the trade in order to secure necessary legislation, to secure proper attention to street repairs and to discuss subjects of truck maintenance, sales and operation. He referred to the L-shaped car track used in this city as antiquated and really injurious to trucks, and stated Philadelphia and Baltimore stood out pre-eminently as the most expensive cities in the country for truck operation because of the street conditions.

Mr. Jackson asked for the co-operation of the men in large industries who were mutually affected by conditions detrimental

to trucks and their use. Traffic legislation was mentioned as a growing necessity in relation to the use of trucks at shipping centers.

Judge Eugene C. Bonniwell spoke on "Some Foolish Legislation," citing glaring instances of proposed bills, that if passed, would kill the truck industry.

He was followed by E. J. Cattell, who told the owners present of the many things that they could accomplish by joining with the Motor Truck Association and making a strong and influential organization out of it.

A number of applications for membership in the association were received from owners and superintendents of delivery.

At the next meeting of the association to be held on Wednesday evening, November 17th, a talk will be given on "Road Conditions," "Highways of Pennsylvania" by Mr. Robert J. Cunningham, State Highway Commissioner.

A paper will be read by Emlen S. Hare and there will be an open discussion from the viewpoint of the owner. Every owner and superintendent of delivery is urged to attend this meeting on the evening of the 17th of November, at the Adelphia Hotel, at 6.30 p.m.

WINTER MEETING OF THE S. A. E.

The 1916 Winter Meeting of the Society of Automobile Engineers will be held in the Engineering Societies Building, New York City, Wednesday and Thursday, January 5th and 6th.

At the first session of the Society meeting, to be held on Wednesday morning, business matters and reports of Divisions of the Standards Committee will be submitted and discussed. Papers on current subjects of special significance are scheduled for the morning and afternoon sessions of Thursday.

It is the purpose of the Council and the Meetings Committee that the coming meeting shall be shorter than the annual meetings of previous years, in order to afford the members an opportunity to concentrate their attendance on fewer sessions during the much occupied time of Show Week. It is believed that the papers to be presented will be of sufficient interest and merit to bring about a good attendance and valuable discussion.

A large portion of the meeting will be devoted to consideration of matters connected with the electrical equipment of gasoline automobiles.

CHASE MOTOR TRUCK COMPANY REPORTS INCREASE

The fiscal year of the Chase Motor Truck Co., Syracuse N. Y., terminated on October 1, at which time the directors were treated to a surprise in the way of a report, showing that the company's business during the past year showed an increase of 218 per cent. over the preceding year.

The Chase Co. is one of the few really big truck manufacturers in this country who have not been swamped by the so-called war orders, and it is said that this company has not, up to this time, shipped a single truck to any warring nation.

The increase is due to the untiring efforts on the part of the dealers' selling organization spreading as it does from coast to coast.

GASOLINE FROM NATURAL GAS

Within a short time several plants will be built in Texas for the manufacture of gasoline from natural gas. There are about fifty plants in Oklahoma which make gasoline from gas which comes direct from the well with crude oil, and which has heretofore been considered a waste product. It takes 500 cu. ft. of gas to yield one gallon of gasoline. The grade of the gasoline obtained from the natural gas ranges from 75 to 90 degrees gravity, and it is then reduced to a gravity of 60 degrees by treating with naphtha. The grade of gasoline obtained from natural gas is more volatile than that obtained from crude oil.

Bosch Magneto Co., New York City, has signed contracts with the following pleasure and commercial car concerns to use Bosch magnetos for the coming season: Chandler Motor Car Co., Cleveland; Crawford Automobile Co., Hagerstown, Md.; Continental Motor Mfg. Co., Detroit; O. Armleder Co., Cincinnati; Palmer-Meyer Motor Car Co., St. Louis; H. E. Wilcox Motor Co., Minneapolis; U. S. Motor Truck Co., Cincinnati; Hendrickson Motor Truck Co., Chicago; Alamo Mfg. Co., Hillsdale, Mich.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Commercial Car Efficiency Increased by Auxiliary Equipment

THE use of spiral chutes in conjunction with motor driven vehicles is a subject which more should be said upon, if one can judge from the comparatively small number of firms using such devices to aid their delivery system. In an accompanying illustration is shown a novel labor and time-saving arrangement in connection with a Haslett spiral chute, made by the company of that name in Philadelphia. It consists of a set of rollers forming a platform of a scale, connected to the chute by a tangent intake. This is in use by Butler Bros., Chicago, Ill. The goods are marked and weighed, and with a slight touch of the hand are propelled into the chute, and almost immediately land at the truck level. The idea is to have one of these on each floor of the building so that each of these places can be used for marking and weighing goods, instead of having all re-handled at the first floor. The chute shown has a trough, 4 ft. wide, and is designed for handling packages 3 ft. wide, 3 ft. high, and 5 ft. long, and weighing up to 800 lbs. Chutes having a capacity up to 1000 lbs. are constructed.

The makers claim that their experience has shown that one chute used for outgoing freight in connection with one elevator for incoming freight have a com-

arrangements were made the afternoon before for a number of trucks to be on hand and when they arrived in the morning, the spiral chute was loaded with sacks of beans which were slid down directly on to the trucks at the curb, the men from the other trucks assisting in storing the goods, and as fast as one truck was filled another took its place. Delivery was made at the rate of 1400 sacks per hour, which would undoubtedly have been impossible

if it had not been for the rapid handling in the building. Needless to say, the goods reached the ship on time.

One of the illustrations shows the delivery end of one of these chutes, crosses the sidewalk and delivers its goods directly into the truck body.

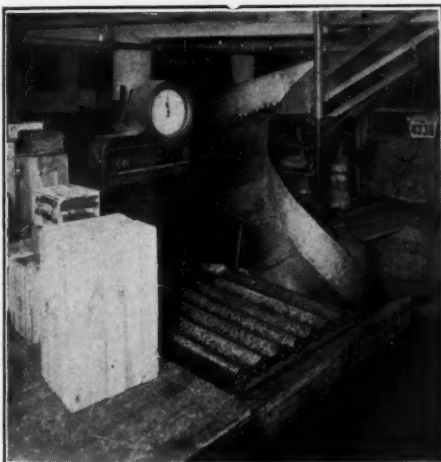
Novel Wrecking Car

A case of auxiliary equipment where used in connection with trucks or pleasure cars is that of the Universal Auto Repair



Delivery End of Haslett's Spiral Chute

Note that the chute extends across the sidewalk and delivers its goods at such a height that it can be instantly stowed in its proper place on the truck platform, thereby saving time and handling



Haslett's Tangential Intake Freight Chute

Showing the roller platform of an automatic scale, from which, by a touch, the boxed goods enter the chute and almost immediately arrive at the other end, at the truck itself.

bined capacity of three elevators used both ways, and that chute equipment saves fifty per cent. of the expense of handling outgoing freight. This expense of course is in labor saving, which means speed and also greater earning capacity for the trucks that have to wait for goods from the upper floors of the building.

An instance of the speed of delivery by this method is well exemplified by a firm obliged to make a very heavy delivery of beans aboard a steamer before noon of a certain day. The time was limited, the



Truck Fitted With Differential Chain Hoist on an Overhead Trolley Running the Entire Length of the Body

This is used as shown, for hoisting heavy material, which can then be placed anywhere desired on the truck

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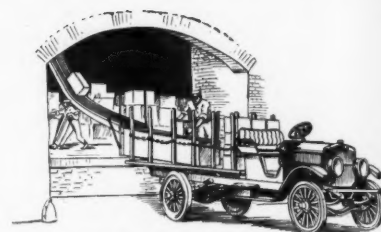
Co.'s wrecking car, of Hartford, Conn. This unique vehicle is shown in an accompanying illustration. The vehicle is specially fitted out for wrecking purposes and is complete to the last detail. The side-lights are lanterns which are removable, the boxes on the sides contain ropes with blocks and tackle. On the floor of the car in suitable supports are a shovel, axe, and sledge, steel pins to drive into the ground, etc. With the Yale & Towne winch a car can be lifted from almost any place. If the car or truck has skidded breaking either a front or rear wheel, it is hoisted up and the combination comes in as a six wheeled vehicle. A separating beam which is shown on top of the winch support is adjustable in length and prevents the trailer from ramming into the wrecker. A searchlight is shown at the rear, which can be used in case a car as fallen over an embankment. The Universal Auto Repair Co. claims that this car paid for itself inside of one year.

Unusual Demountable Body Used by Grocer

Haworth & Dewhurst, Ltd., wholesale grocers of Pittsburgh, Pa., have worked out a rather unusual arrangement of demountable bodies for use on their Packard 3-ton trucks. Mr. Fred Haworth, a mechanical engineer, was very desirous of installing demountable bodies, but did not approve of the use of bodies in which the load was carried on rollers or wheels, or the use of inner bodies, in fact he was anxious to get away from any construction where the weight was distributed at only certain points. This necessitated designing something entirely new. It was an easy matter to build a body which could be removed by means of a crane from the truck chassis. Unfortunately, there was not sufficient room for a crane having lateral movement as well as forward and back motion. The accompanying illustrations show the type of body and crane that was finally developed, and which has proved most satisfactory in service. They have now been in use several years.

Removable Wooden Slide Assists Truck Loading

Colgate & Co., Jersey City, N. J., the well-known manufacturers of toilet soaps and perfume, are among the pioneer truck users, having been among the earliest users of electric trucks in the Metropolitan District. They are now using some fifteen commercial cars, which include two 5-ton Packards and several 3-ton Hewitts. A loading device, which is not new with them, but was first developed for use with horse trucks, now assists greatly in the rapid loading of their commercial cars. As shown in an accompanying sketch, it consists of a slide from a second story of the building, made of hardwood strips, with openings between them. The front end of this slide is supported from the ceiling, and



Slide With Extension

This wooden slide from the second floor is provided with a boxlike extension, which rests partly on the truck and partly on the platform connecting with the main slide, thus delivering the boxes near the front end of the truck, where one man can stow them without depending upon others to pass the boxes to him, and without congesting the platform. When packing the rear of the load this movable extension piece is shifted back out of the way under the main slide.



Completely Equipped Wrecking Car

This machine, fitted with a Yale & Towne winch for hoisting, has a complete equipment of tools—searchlight, removable lanterns, etc.—for bringing in disabled machines



A Haworth & Dewhurst Truck Being Loaded, and the Interior of the Warehouse

Some lateral rollers are attached to the bottom to permit the body to be pushed from beneath the crane. This is necessary, due to limited warehouse space. Four-inch, inverted angle-iron strips are attached to the bottom of the body. Four-inch longitudinal bolsters are then used in the bottom of the body, so that the variation from six to eight inches in the position of the chassis will be taken up as the load is lowered, and when lowered small eccentrics clamp the body firmly to the chassis.

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the slide is so hinged that it can be raised out of the way of those on the platform. A novel feature of the arrangement, however, is the use of an extension of this slide which is placed directly on the truck abutting against the lower end of the main slide. In loading long truck bodies, the boxes from the second floor come down the slide, and by friction come to rest close to the end of the auxiliary or movable slide resting on the truck floor. This brings the boxes within reach of the man close to the front seat, and allows him rapidly to stow the load back to about the middle of the truck body. When this point is reached, the extension to the slide is moved to one side, and slid back on the floor underneath the main slide. The man standing at the tailboard of the truck then receives the boxes from the main slide, and stows the rest of the load. This has worked out very satisfactorily, is inexpensive and is undoubtedly adaptable to the loading of trucks in many different lines of service.

Trucks with winches are now quite common, but trucks fitted with jib cranes are more or less novel. In an accompanying illustration is shown a truck operated by the Homestead Mills of the Carnegie Steel Co., which is so equipped. This crane has a capacity of one ton, which it can pick from the ground and place in any position on the truck. Its installation on the truck was primarily due to the safety first campaign inaugurated by the United States Steel Co., but has since been found to materially reduce the cost per barrel of delivering lubricant.

Baltimore Bargain House Trucks

One of the most complete installations in the country for the rapid handling of demountable truck bodies is that of the Baltimore Bargain House, Baltimore, Md. This company found that it did not have room to use trucks in the ordinary way at its loading platform at the store in the center of the city. Superintendent Nielson, early



Rapid Loading by Body in Sections

This Packard truck in municipal service has two metal containers which together form a body. These are picked up separately by overhead electric hoists, which require but a couple of minutes to supply the truck chassis with its load.

recognizing the advantages of quickly demountable bodies, worked out a system in connection with the use of Yale & Towne Triplex Hoists. This has now been in use about three years, and was described at length in our April, 1914, issue. Briefly, the bodies are suspended with side against the platform; the truck drives into the 38 ft. wide passageway; the body is hoisted off while the truck is the width of a body from the platform and parallel to it. There is always one empty space into which this body is then moved by the overhead hoists which are on trolleys, the truck backs to a position parallel with and opposite the body

which it is to receive, and this body is then moved over the truck and lowered on to it, the whole operation from the time the truck enters the areaway until it leaves with a loaded body being between 5 and 6 minutes.

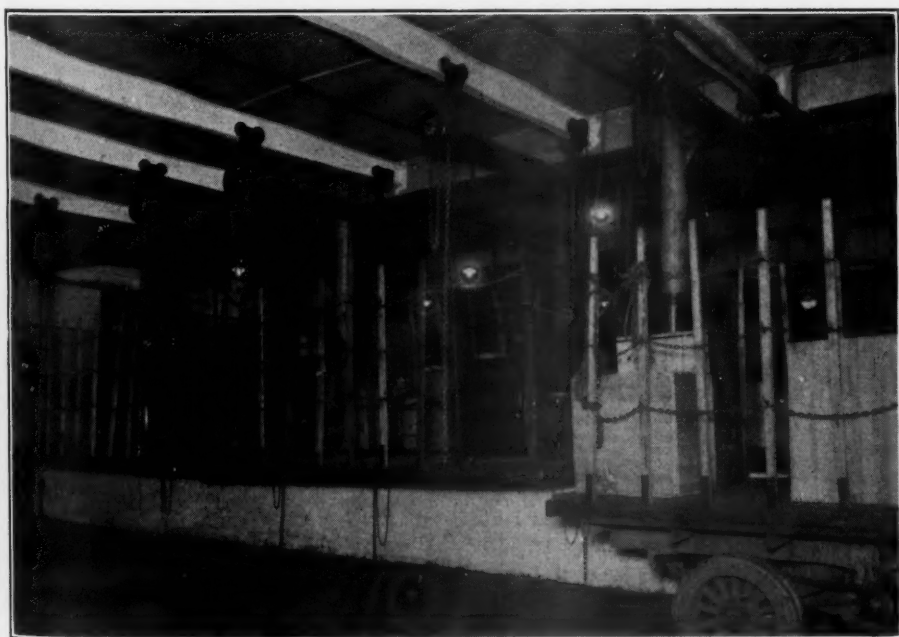
An enormous warehouse containing over 440,000 sq. ft. has been built during the past year, and is completely equipped with the same unloading mechanism for handling the separable truck bodies which are of stake platform type. The trucks have, with this arrangement, doubled their efficiency, and save approximately an hour a day each week, which is figured by the company as a saving of \$2400 per year per truck. The system has also prevented the company from having to buy increased loading space in the heart of the city where land is at a premium. Each body is 17½ ft. long by 7 ft. wide. The stakes are removed on the side toward the platform, the bodies being flush with same. Each of these bodies therefore gives an additional platform space of 122.5 sq. ft. These bodies can all be loaded as rapidly as desired, and the trucks come in one after the other, leave the empty and take on the full body.

Arrangements are now being completed for the installation of the same kind of handling equipment at the railroad freight station, and when this is completed there will be no hold-up in the use of demountable bodies at any of the points where a great number of loads are handled per day.

These installations at railroad freight stations are interesting, as they point to the mechanical equipment which in all probability will be more commonly used at such freight terminals in the future.

This instance, and the one in connection with the Curtis Publishing Co., of Philadelphia, are undoubtedly two of the entering wedges for more up-to-date methods to assist trucks at the crowded railroad terminals.

(Continued on page 42)



Demountable Bodies Used by the Baltimore Bargain House

The bodies are suspended by Yale & Towne hoists, with their sides against the platform. The body is hoisted off while the truck is the width of a body from the platform, and parallel to it.

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CCJ GALLERY of SALES MANAGERS

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BROWN AUTO CARRIAGE CO
CLEVELAND OHIO

HIS HOBBY IS SELLING MECHANICAL BODIES EVEN HIS POOR CHILDREN HAVE TO PLAY WITH MECHANICAL DUMP TRUCKS

I.M. LEWIS SALES & ADV. MANAGER
BESSEMER MOTOR TRUCK CO.

THE HIGH GEAR SALES MANAGER

R.T. HODGKINS SALES MANAGER
STUDEBAKER CORPORATION
DETROIT, MICH

A HEAVY WEIGHT AMONG THE SALES MANAGERS

LEIGH S. BACHE 1 ST. VICE PRESIDENT
SALES & GENERAL MANAGER
GRAPHITE LUBRICATING CO.

W.A. BAXTER VICE PRESIDENT & SALES MANAGER
DART MOTOR TRUCK CO.

IN THE SHRINERS HE IS MADE TO THROW THE BULL BUT AS SALES MANAGER OF THE DART HE DOESNT HAVE TO HIS BUSINESS THERE IS TO THROW THE HORSE. AND MANY A HORSE HE HAS THROWN OUT OF A GOOD JOB.

W.J. MURRAY ASST. GEN. MANAGER & SALES MANAGER
SPLITDORF ELECTRICAL CO.

THE RAPID TRANSIT SALES MANAGER

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers



Packard Changes to Worm Drive and Brings Out a One-Ton Model

ALTHOUGH differing but slightly in appearance from the trucks that have so long borne that name, the line put on the market this year by the Packard Motor Car Co., Detroit, Mich., offers radical departures in design and detail from former models.

Some of the changes are sweeping, and there are numerous innovations that continued service over an extended period have shown to be in the direction of greater efficiency. The line includes 1-, 1½-, 2-, 3-, 4-, 5-, and 6-ton models, the first five sizes of which are on the market, while the larger models are not yet in shape to begin deliveries owing to the heavy demand for the smaller types. However, everything is in readiness for their manufacture when conditions permit.

Change From Chain to Worm Drive

Foremost among the features of the new Packard line that command attention is the change from double chain to worm drive, a practice whose soundness has been conclusively demonstrated. The T-head type of engine cast in pairs has been supplanted by the L-head, block cast, and instead of the unit jackshaft and differential there is a unit power plant assembly, with the engine, clutch and gearset grouped. Other innovations include a change from right to left side steering with a new steering gear throughout, an adaptation of the control board used on the Packard touring cars with such marked success, enclosed valve mechanism and pressure oiling on the engine, three-point suspension for the complete power plant, increased accessibility and simplicity, lower suspension, with new broad-leaved springs that are nearly flat instead of the more elliptical form previously used, and location of the service brake on the driving shaft instead of on the jackshaft. Another change of importance is the adoption of an electric lighting and starting system for trucks of all sizes, not as a stock equipment, but as a special appliance, for which ample provision has been made in manufacturing.

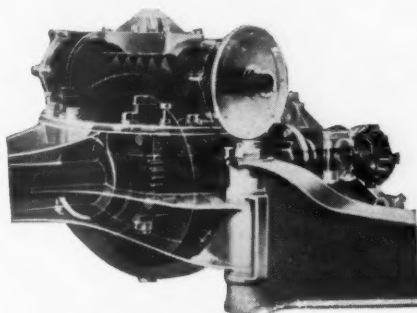
Familiar Features Remain

With all these refinements and changes, the distinguishing marks of the Packard remain. The familiar radiator is continued, and the scroll springs which support it differ from those that have gone before only in the fact that they are of heavier and more durable material. The same form of dash and seat are retained, and the armored wood bumper occupies its accustomed place.

The One-Ton a New Light Model

This year the Packard Co. is producing the lightest truck it as ever turned out—1-ton—and while the retention of the larger sizes indicates that the company is in the heavy field in earnest, interest naturally centers in the latest comer, which has already given evidence of its popu-

larity. For this reason, its consideration in detail is of moment.



Packard Worm Drive

Phantom view of rear-axle construction, showing location of worm and worm wheel

One of the striking characteristics of the Packard is the manner in which accessibility has been worked out, with a view to rendering operation and maintenance as simple as possible. For example, the entire worm drive unit may be dismantled without jacking up the vehicle or in any way disturbing the road wheels. Again, by removing the radiator and bumper and taking out the intervening engine connections, the entire plant may be removed by

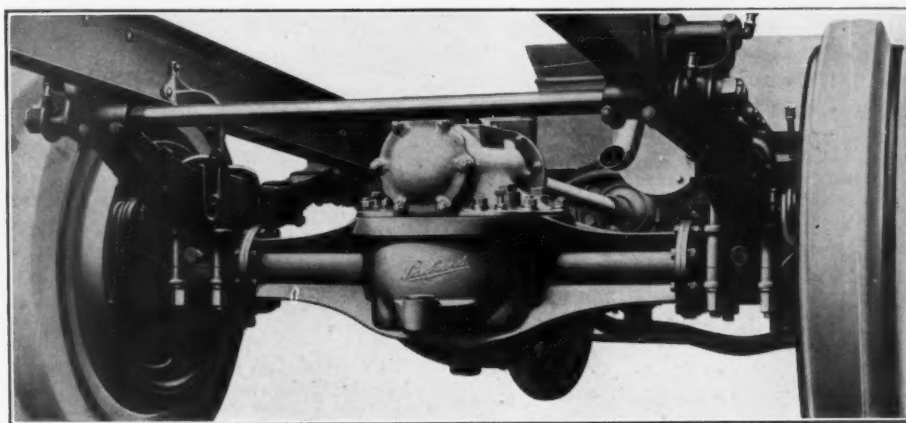
simply running it out of the frame on to skids, doing away with the necessity of any hoisting.

Mechanical Features

The cylinder block is bolted to a two-part aluminum crankcase which encloses the clutch and flywheel and supports the gearset. The valves are all on the right side, with their mechanism enclosed by two pressed plates. The exhaust header is a straight expansion chamber, above the valve enclosures and having three ports.

Intake passages are cored in the cylinder block, the gas passing to the left side between the end pairs of cylinders. On the left side the gas passage terminates in an open core way which is closed by a plate forming the base of the inlet pipe. With a view to making the passage of gas from the mixing chamber to the valves as short as possible, the carburetor has been placed rather high on the side of the engine. It is provided with a hot water jacket and hot air intake to insure the highest efficiency from low grade fuel, and is of Packard design throughout.

On the left side of the engine, adjacent to the carburetor, is also located the pump and governor shaft. This in turn serves as a driving-shaft for the starting and lighting generator, the flywheel housing having



Rear View of the Packard Worm Axle

The rear axle of the new Packard truck is a built-up structure. The lower section acts as an oil reservoir and is provided with an oil level and filler plug, which automatically prevents overfilling

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a removable plate on this side for the reception of the fitting for the flywheel-drive starter. The centrifugal type governor is entirely enclosed and sealed to prevent tampering.

Ignition

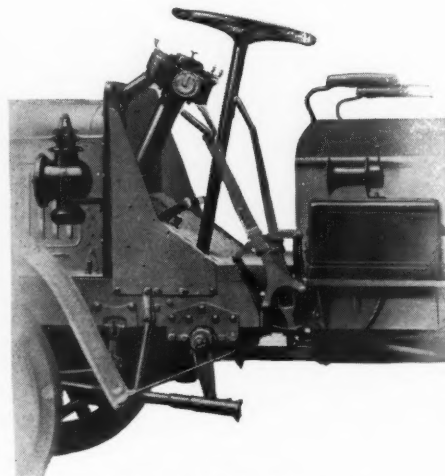
The Bosch dual magneto is situated on the right side of the engine, and is driven by a second shaft corresponding to the pump and governor shaft. The high tension cables are carried in tubular metal looms.

The traditional dust pan is eliminated in an ingenious manner, the upper half of the crankcase being extended out to the side frame members.

The Packard engine, of 32.4 h.p., rating by A.L.A.M. standards, has a bore of $4\frac{1}{2}$ in., and a $5\frac{1}{2}$ -in. stroke. It is suspended at three points. The valves are of tungsten steel, enclosed in oil-tight and dust-proof compartments. The pistons are tapered to provide for expansion, and fitted with compound rings, the two lower grooves having two rings each, with one fitted in the upper groove.

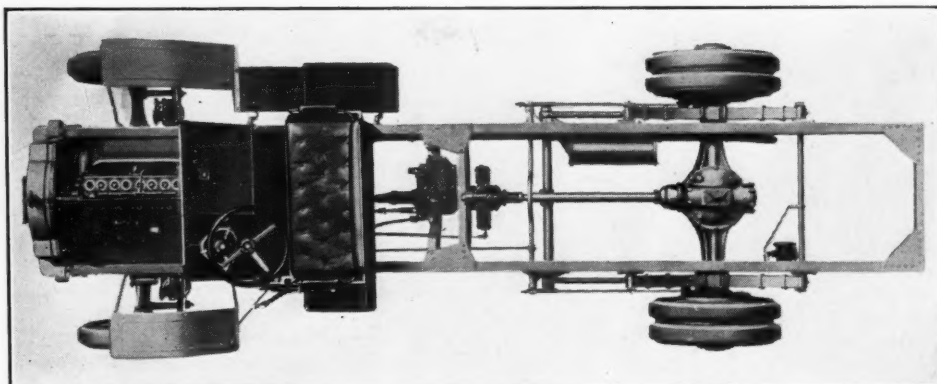
The camshaft is a high-grade forging with the cams forged integral, hardened and accurately ground. A feature at this point is that the large diameter of the bearings permits the easy withdrawal of the shaft without disturbing the bearing

back of the flywheel housing, and can be removed separately, carrying out the idea of accessibility manifest all through the truck. A large inspection plate is held in place by hinged thumbscrews, and the unit may be removed without disturbing the steering gear or engine. The clutch is a



Packard Control System

The controls for the engine, carburetor and electrical system are centralized on a control board, located independently, in front of the steering column, where the controls may be easily reached by the operator.



Plan View of New Packard Truck Chassis

This view gives an idea of the practical utility with which this newest of transportation units has been designed. Worm drive is one of the new features

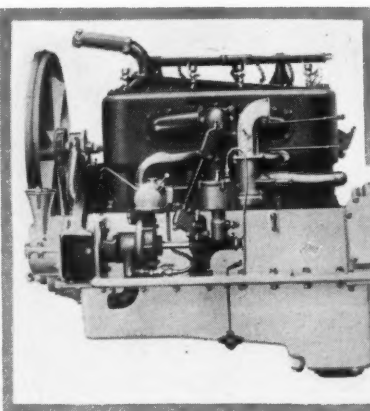
bushings. Connecting-rods are the conventional I-beam type.

Crankshaft and Case

The crankshaft is a drop forging of high-grade steel, heat-treated. It is mounted in four babbitt-faced bronze backed bearings, carried on the upper section of the crankcase. The case is in two parts, with wide cast webs running lengthwise in such a manner as to protect the carburetor and engine accessories from mud and water. The entire lower section is removable without disturbing the crankshaft bearings, front cover or clutch. The pump by which lubrication is maintained is located in this section, and is driven from the camshaft by a worm gear. The front gears, of the helical spur train type, with ample bearing surface, are lubricated by the overflow from a bypass at the front of the engine.

Clutch

The clutch housing is formed by a casting bolted to the flange on the crankcase



Packard Power Plant

Left side of the power plant reveals the carburetor, which is provided with a hot-water jacket and hot-air intake to insure the highest efficiency from low-grade fuel. The three-quarter front view shows the front-end gears and section of cylinder cut away.

Packard dry plate type, unaffected by atmospheric conditions.

Transmission

Located midway on the frame is the transmission, connected with the clutch by means of a shaft with two universal joints, and supported at three points by two pressed steel frame cross members. A left-side gear shifting lever operating in a Packard semi-selective quadrant gives three speeds forward and one reverse. Direct drive is obtained on third speed. The lever moves forward and backward for forward speed, and laterally for reverse.

Power from the transmission is conveyed to the worm shaft in the final drive through a shaft and two enclosed grease packed universal joints.

Rear Axle

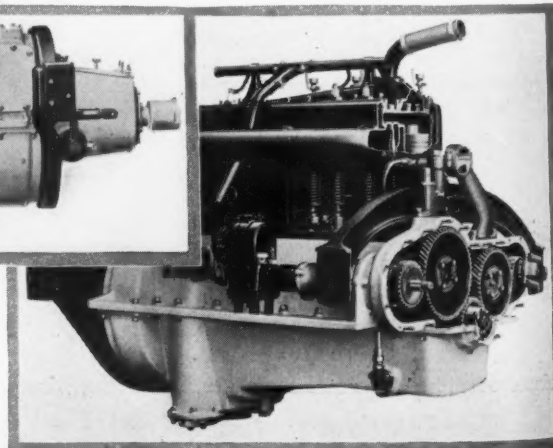
This brings the investigator to the rear axle, a built-up structure that contains several interesting features. The weight of the truck at this point is carried on heavy steel tubes, which are hydraulically forced into a strong central cast steel housing. The worm, which is mounted above the worm wheel, and the worm wheel and differential, as shown in the accompanying illustration, are mounted as a unit in a cast steel carrier that is bolted in place in the center housing of the axle. This design permits quick and easy disassembling or assembling of the worm, worm wheel and differential, and their removal without taking the axle from under the truck. The lower part of the axle housing forms an oil reservoir of large capacity, with an oil level and filler plug which automatically prevents over-filling. Provision is made for a constant lubrication of all bearings.

Frame

The frame is of channel section rolled steel, with channel steel, pressed steel and tubular cross members at suitable intervals. All joints are riveted to angle sections and reinforced by gusset plates.

Brakes

Ample braking capacity is provided. The service brake consists of two wire woven asbestos lined contracting shoes, operating on a drum at the rear of the transmission. Under normal conditions this brake will lock the rear wheels with a full load. The two emergency brakes are internal expanding segments, acting on pressed steel drums on the rear wheels,



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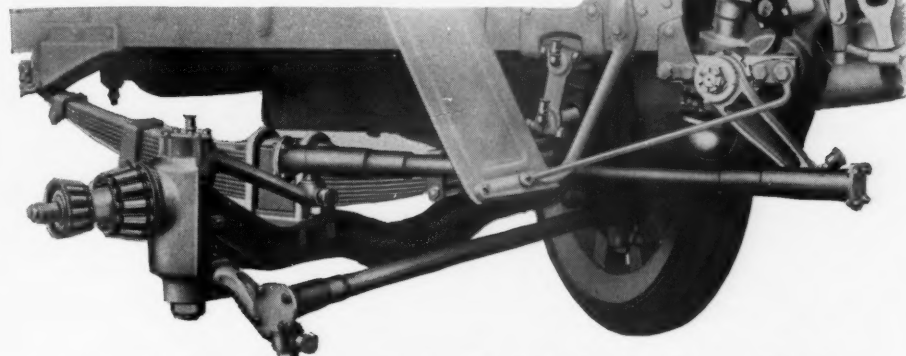
and operated by a hand lever at the driver's left.

The steering gear is of worm and wheel type, these being forged integral with their respective shafts. This makes adjustment an easy matter. Steering connections are of the inverted yoke type. Connections have hardened and ground steel balls bearing on sockets treated in the same manner and held in contact by springs. The steering knuckle connecting-rod lever is heavy oval section forged integral with the knuckle itself. The levers are of heavy I-beam section, heat-treated and drop-forged.

Springs are of semi-elliptic type, front and rear. The former are 3 in. wide and 42 $\frac{3}{4}$ in. long, the latter 3 in. wide and 46 in. long.

Wheels

Front wheels are 36 in. in diameter, with twelve spokes. The rear wheels are 40 in. in diameter, with fourteen spokes. They are of heavy artillery type, with spokes mounted centrally in the felloe. The stand-



Steering Connections and Steering Gear of the New Packard Truck

The steering gear is of the worm and sector type. Both worm and sector are forged integral with their respective shafts. Adjustment may be made without removing the steering assembly from the frame



Packard Clutch

Cutaway section of dry-plate multiple-disc clutch on new Packard

ard equipment of tires is single solid 36x 5 in. front, and dual solid 40x5 in. rear.

A 21-gal. gasoline tank is under the driver's seat, with an automatic pressure pump operated by the engine, assuring adequate fuel supply on the heaviest grades. A hand-pressure pump is attached to the heel board for initial pressure.

It is no longer considered sufficient that a truck can haul a load to a given point. It must be pressed into service in unloading and in providing energy for other purposes. Engine power in the Packard can be utilized for driving winches, cranes, sprinkling apparatus, and in various other ways. The special attachment which makes this possible is provided at an additional cost.

The price of the new Packard is \$2200 for the 1-ton model, \$2500 for the 1 $\frac{1}{2}$ -ton model, \$2800 for the 2-ton, \$3400 for the 3-ton, and \$3800 for the 4-ton. Inasmuch as the company has been too busy manufacturing the lighter types to put the 5- and 6-ton models on the market no prices are quoted on these.

New Buick Has Overhead-Valve Engine and Full Electric Equipment



ANNOUNCEMENT of a commercial car, having a capacity of 1500 to 2000 lbs., has come from the Buick Motor Co., of Flint, Mich. This commercial model, known as the "D-4," sells for \$1150 f.o.b. Flint, for the chassis minus body, seat, top, \$1250 being the price for the machine equipped as illustrated herewith. In this D-4 model is incorporated unit power plant, 122-in. wheelbase, 37 h.p. valve-in-head engine, electric starter and lights, and 5-in. pneumatic tires.

Unit Power Plant

The engine used is of the regular Buick type, and is claimed to deliver more power to the rear wheels than any other type of engine of the same size. The power plant has three-point suspension. The engine has cylinders cast in pairs of semi-steel. The crankshaft is three-bearing, with bronze-backed bushings having die-cast Babbitt linings. The valves are of tungsten steel, push rods having adjustable ball end, rocker arms being ball socketed with felt oil retainers.

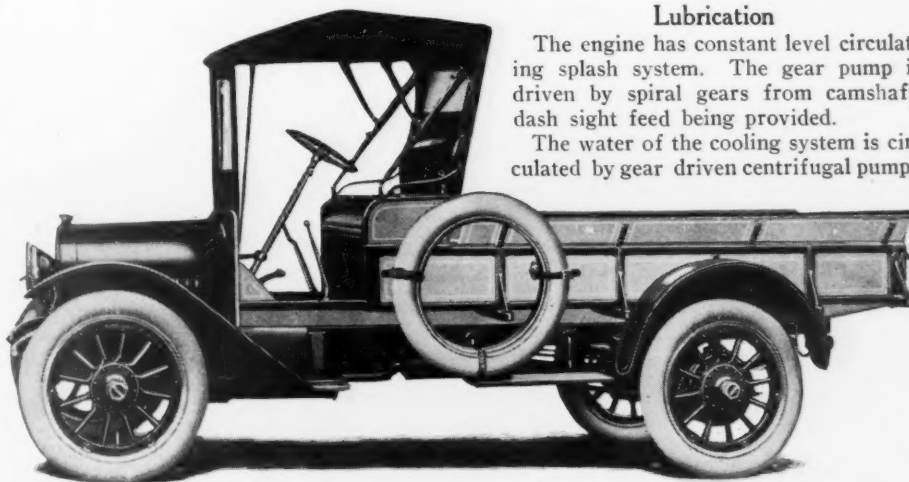
The clutch is cone type, leather faced, with springs to give easy engagement. The transmission is selective sliding gear type, giving three forward speeds and one re-

verse. Gears are of heat-treated nickel steel, the clutch gear and sliding gear shafts having annular ball bearings, the counter gearshaft having bronze bearings.

Lubrication

The engine has constant level circulating splash system. The gear pump is driven by spiral gears from camshaft, dash sight feed being provided.

The water of the cooling system is circulated by gear driven centrifugal pump;



Buick Commercial Car Fitted With Express Body

This illustrates the new model D-4 Buick commercial car, which has engine of 37 h.p., four cylinders, overhead valves. The chassis has full elliptic springs in the rear and 35 x 5 in. tires

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the radiator used is new style cellular type. Fan is pressed steel driven by flat belt, adjustable.

Ignition

Ignition is by jump spark, current supplied by Delco generator, which also supplies lights. Spark advance is automatic or manual. Dry cells are kept for reserve.

The improved Delco single-unit system of starting, ignition and lighting is used as integral part of engine, with ammeter and switch on dash.

The carburetor is automatic float-feed type, with choker on dash, and is fed by gravity from 12-gal. gasoline tank under seat.

Drive is through bevel gear differential, gear case of hardened nickel steel. Hyatt roller bearings used, with ball thrusts. Propeller shaft enclosed. Thrust and torque taken by yoke on end of third member.

Rear axle is three-quarter floating type, nickel steel main shafts, Hyatt bearings. Front axle is drop-forged "I"-beam section.

Brakes

Service brake is external contracting, emergency is internal expanding, both operating on rear wheel drums.

Steering gear is the split nut and worm type, semi-irreversible, adjustable ball

thrust bearing, one-piece housing, 17-in. steering wheel.

Wheels are wood, artillery type, twelve spokes, Baker demountable rims. Front springs are semi-elliptic, rear are full elliptic.

Frame

The frame is pressed steel, extra strong, and narrowed at front to permit short turning radius.

The body is open express type, with wing boards. Lodging space about 4x8 ft. Tread is 56 in.

Standard equipment includes electric head lights and dimmers, tail-light, trouble light and extension, electric horn, extra rim, pump, tools, etc.

New Standard Two-Ton Truck, Strongly Built; Three and a Half Ton Model With Chain or Worm Drive



THE 2-ton Standard truck, built by the Standard Motor Truck Co., of Detroit, Mich., is manufactured to supply the demand for a lighter truck, this company having heretofore made 3, 4 and 5-ton models only. Realizing that this capacity truck was often overloaded, the company's engineers have built this truck very strong and heavy, that it might stand the heavy loads and abuse which is often given trucks. The 3½-ton model is made in chain and worm drive.

The New Two-Ton Model

This model was built for economy and permanency. It has steel frame, extra heavy channel; David-Brown worm drive; speed governor; Continental engine; three-point suspension and other features. Frame length back of seat is 10 ft. 2 in. Body is not included in the price, which is \$2000 f.o.b. Detroit. Equipment includes all steel seat, 20 gal. welded steel gasoline tank, steel fenders, three oil lamps, mechanical horn, tools, jack, etc.

Engine

The engine is a Continental, bore 4½ in., stroke 5¼ in., cylinders "L"-head type, cast in block. Connecting rods are drop-forged, heat-treated, crankshaft the same,

being ground in addition. Main bearings nickel babbitt, adjustable from exterior. Timing gears helically cut.

Lubrication is force feed and splash with gear pump and oil reservoir in sump of crankcase. Oil is filtered. Connecting rods have scoop for thoroughly oil cylinder walls. Crankcase has oil gage. Standard "Economy" float feed carburetor, ignition by Eisemann high tension magneto.

Clutch, Axles, Drive

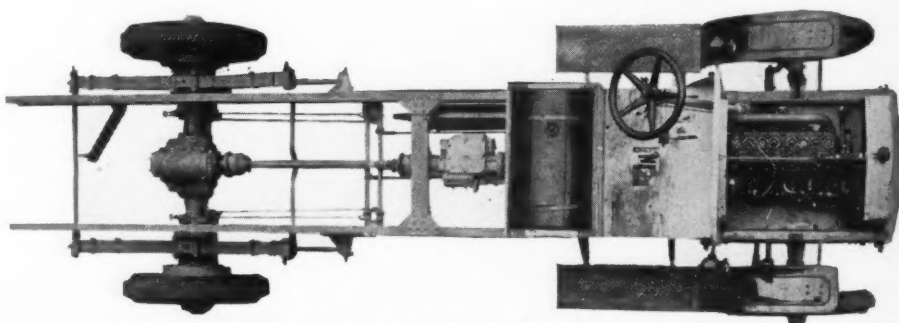
The cone clutch is leather faced and controlled by pedal. Transmission is selective type, three speeds forward, one reverse, gears being nickel steel, heat-treated. It has roller bearings and three-point suspension.

The front axle is drop-forged "I"-beam section. Rear is David-Brown worm gear full-floating type. Drive is by Timken-David Brown shaft and worm, straight line drive, shaft having two universal joints and being 1½ in. in diameter. All bearings Timken roller. Radius rods are nickel steel, solid section.

Brakes are two sets duplex type, being independent double acting, operating and encased in a single drum on each rear wheel, and operated by pedal and hand lever.

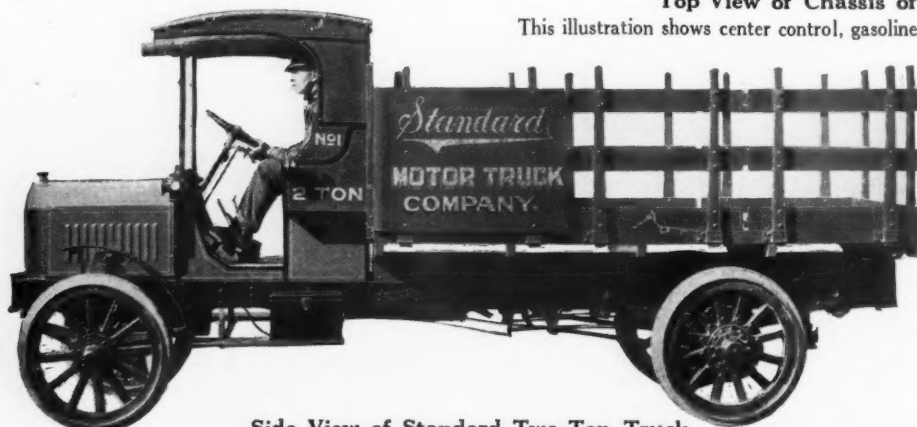
Frame

This is of extra heavy channel section rolled steel, 1.92x6 in., 8-lb. section.



Top View of Chassis of Standard Two-Ton Truck

This illustration shows center control, gasoline tank, transmission, springs and worm drive at axle



Side View of Standard Two-Ton Truck

This illustration shows the truck complete; the body, however, is not included in the price. The wheelbase is 140 in., tread 58 in., turning radius 20 ft. Normal speed 15 m.p.h.

Wheels are artillery type, 36 in. S.A.E. tires are 36x4 in. on front wheels, and 36x6 in. rear; tires are endless solid rubber. Steering gear is irreversible worm type with throttle on top of 18-in. steering wheel.

The Standard Three and a Half Ton Model

This model has capacity of 7000 lbs., engine, clutch and transmission in unit, very heavy frame, engine governor, standard wheelbase is 12 ft., turning radius 27 ft. Wheelbase and loading space can be had longer or shorter. Chain drive. Chassis sells for \$2750; the worm drive for \$2800 f.o.b. Detroit.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

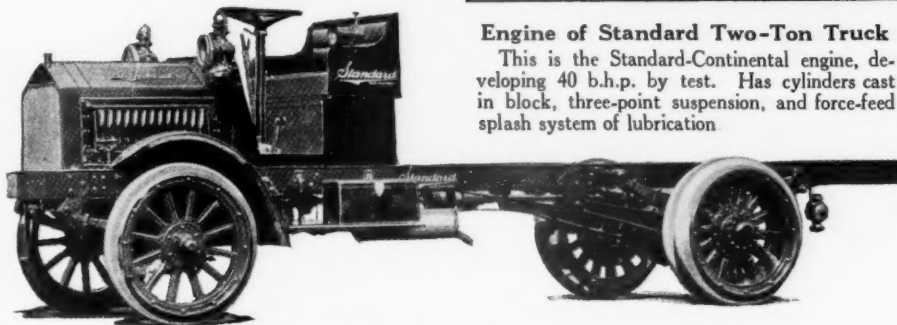
Unit Power Plant

The engine has four cylinders, cast in pairs "L"-head type, bore $4\frac{1}{2}$ in., stroke $5\frac{1}{2}$ in., pump and splash lubrication, helically cut gears, carburetor of special design, and Eisemann high tension magneto ignition. Governor limits engine, normal speed, 12 m.p.h.

The clutch on this $3\frac{1}{2}$ -ton model is multiple disc dry plate type, having thirteen discs, six being faced with Raybestos. The transmission is selective type, chrome-nickel steel gears, roller bearings, and has three speeds forward and one reverse.

Front Axle

This is a drop-forged "I"-beam section, equipped with Timken bearings. Springs are made of alloy steel, eyes bronze bushed, front being $45 \times 2\frac{1}{2}$ in., rear $52 \times 3\frac{1}{2}$ in. The frame is 6-in. channel, 15-lb. section. Steering is the Gemmer worm and gear heavy truck type. Wheels are extra strong with very deep spoke pockets.



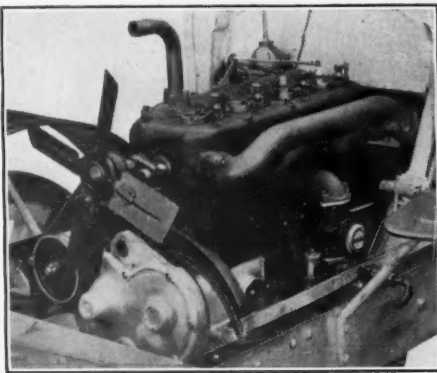
The Standard Truck, Three and a Half Ton Model

The three and a half ton model can be had with either chain drive or David Brown worm drive. This illustration shows the latter model

Chain Drive

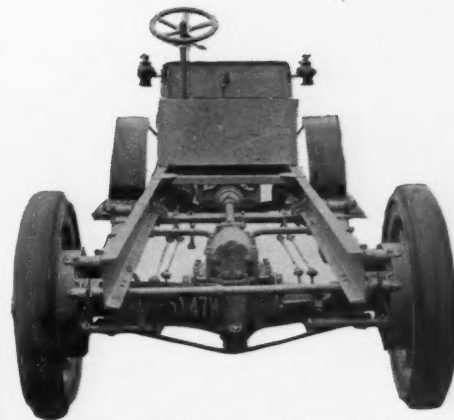
From transmission to jackshaft drive is through shaft with two universal joints. Joints protected by metal housing.

The jackshaft has pressed steel housing. Gears and shafts are nickel steel, heat-treated, and mounted on Timken roller bearings. Jackshaft sprocket bearings directly in chain line. Entire unit accessible and quickly removed. The rear axle is



Engine of Standard Two-Ton Truck

This is the Standard-Continental engine, developing 40 b.h.p. by test. Has cylinders cast in block, three-point suspension, and force-feed splash system of lubrication.



Rear-End View of Standard Two-Ton Truck

This illustrates the heavy construction of this two-ton truck. Note the worm drive, large tires and side pieces of frame.

rectangular forged, guaranteed capacity 11,000 lbs. Wheels have Timken bearings.

Worm Drive

Propeller shaft with two universal joints connects transmission and worm drive axle. The rear axle has David-Brown worm gear drive, of the full-floating type, and has chrome-nickel steel shafts and Timken bearings throughout. Gear reduction is 10.33 to 1.

Brakes

The external service brake on this model operates on 12-in. pressed steel drums, and has bands faced with Raybestos. The emergency is internal expanding and operates on 18-in. drum. Front tires are 36×5 in., rear 36×5 in. dual.

Equipment includes seat, fenders, three oil lamps, horn, tools, jack.

New GMC Worm and Chain-Drive Truck Chassis



THE three GMC truck models, described herewith, are made by the General Motors Truck Co., of Pontiac, Mich., one having $1\frac{1}{2}$ ton capacity, worm drive, the other models being chain and worm drive with capacity of 2 tons. As these models resemble one another, only one will be described, and the others will have mentioned the differences only.

Model 31 GMC One and a Half Ton Worm-Drive Chassis

Type A of this model has 130 in. wheel-base; type B, 144 in. Price chassis only \$1900, f.o.b. Pontiac, Mich.

Capacity 3000 lbs., in addition to 1050 lbs. allowed for body. Speed limited to 16 m.p.h. Wheels are artillery type, wood, Timken bearings. Front tires are $36 \times 3\frac{1}{2}$ in. single, rear 36×5 in. single, tread $58\frac{1}{4}$ in. Steering left side, screw and nut type. The 20 gal. gasoline tank is located under seat. Equipment, three lamps, horn, tools, jack, fenders.

Unit Power Plant

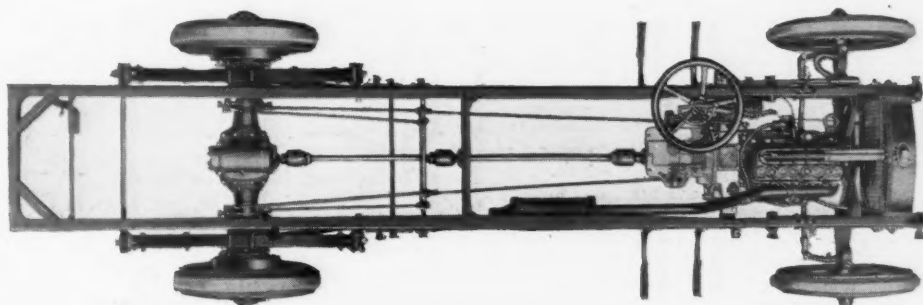
The unit power plant has three-point suspension. The engine is four-cylinder,

water-cooled, cylinders "L"-head type, cast in block, bore $3\frac{3}{4}$ in., stroke 5 in. Connecting-rods drop-forged, helical cut timing gears, aluminum crankcase. Lubrication is by combination force-feed and constant level splash system. Ignition by Eisemann high tension magneto. Carburetor is automatic float feed type. Water is circulated by centrifugal pump. A 16-in. fan mounted on ball bearings aids cooling. Engine has governor which limits its speed.

Transmission

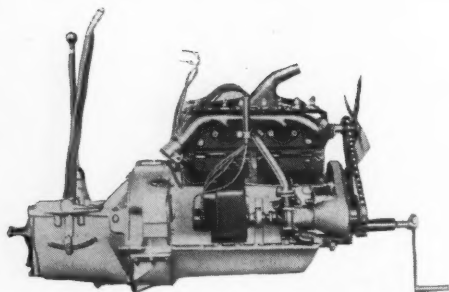
The clutch, of multiple disc dry plate type, and the transmission complete the power plant. The latter is selective sliding gear type, giving four speeds forward and one reverse, Timken bearing equipped.

Drive is by solid nickel-steel shaft, heavy, in two pieces, using three universal joints, shaft supported in center on self-aligning ball bearing. Bevel pinion differential has gears drop-forged, hardened,



Top View of GMC Chassis

This illustration shows the general plan of the light GMC worm-drive trucks. Note the three universal joints



GMC Power Plant, Right Side

This illustration shows magneto, water pump, valve enclosures, etc. The transmission has four forward speeds.

and heat-treated. Radius rods of "I"-beam section, adjustable, with swivel front end connection.

Axles

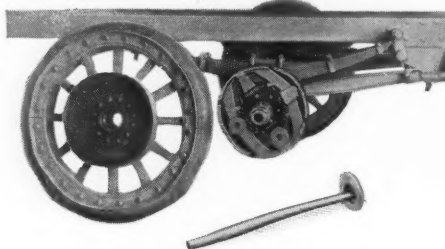
Front axle is "I"-beam steel forging, 2 3/4 x 2 in. The rear axle is Timken-David-Brown full-floating type, worm of special alloy steel, worm gear of special bronze.

Two sets of brakes have Raybestos lined shoes, expanding on rear wheel drums. Springs are semi-elliptic, of high carbon, oil-tempered steel, with eyes bronze bushed.

Model 41 GMC Two-Ton Worm-Drive Chassis

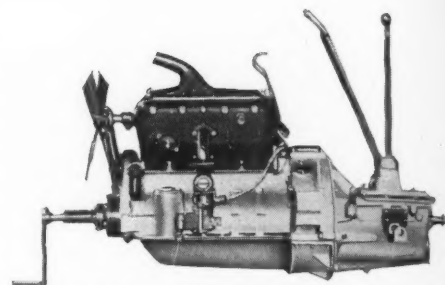
Type A of this model has 144 in. wheel-base; type B, 158 in. The price of chassis only f.o.b. Pontiac, Mich., is \$2375. Capacity 4000 lbs., 1250 lbs. having been allowed for body. Speed, 14 m.p.h. Tires are 36x4 in. all around with dual in rear. Front tread, 59 1/4 in., rear 58 1/2 in.

The engine of this power plant has bore 4 1/8 in., stroke 5 1/4 in. Clutch, transmission, cooling, ignition, carburetion and lubrication are the same as Model 31. Driving system the same as Model 31, as is the balance of the details.



End View of GMC Rear Axle

This shows one end of axle with wheel removed and floating axle shaft withdrawn, showing clearly the duplex system of internal brakes.



GMC Power Plant, Left Side

Showing the unit power plant of GMC trucks, the one and a half and two-ton chassis being about the same except for size.

Model 40 GMC Two-Ton Chain-Drive Chassis

This model differs from Model 41 only in the drive. From transmission to jack-shaft drive is by propeller shaft with two universal joints. Jackshafts are large and of chrome-nickel steel, heat-treated, machine finished, operating on double row ball bearings. Roller chains transmit drive from jackshaft to rear wheels. Rear axle is drop-forged, heat-treated round section, 3 1/2 in. in diameter. Tread is 59 1/4 in. in front, rear being 63 15-16 in.

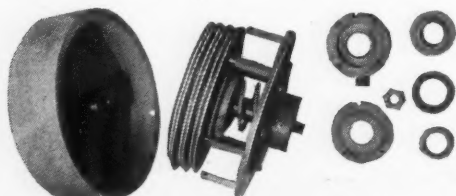
B. A. Gramm's New Five to Six-Ton Truck Has Worm Drive



THE new model 5 to 6-ton B. A. Gramm's Truck, made by the Gramm-Bernstein Co., of Lima, Ohio, is characterized by the employment of heavy construction throughout. The engine is a powerful four-cylinder unit, of long stroke type; bore 4 1/2 in., stroke 6 3/4 in., equipped with governor.

Cooling is by water system, using cellular radiator mounted on springs. Lubrication is by force feed and splash system. Stromberg and Zenith carburetors used on American and foreign models. Ignition is by Bosch magneto. The clutch is dry-plate multiple-disc type.

The transmission has four forward speeds, one reverse, and is of the individual clutch type, with gears always in mesh. Clashing or stripping of gears is



Parts of Multiple-Disc Clutch

There is no delicate mechanism to get out of order in this clutch. This clutch is smooth in action, positive, fool-proof, and needs no adjusting.

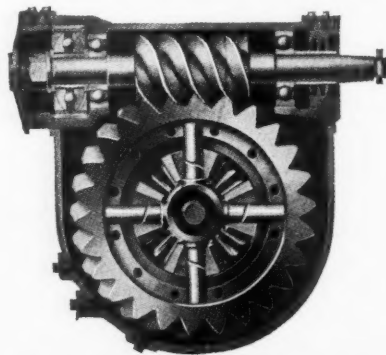
said to be impossible on account of the use of these dog clutches. Gears and shafts operate on ball bearings.

The worm drive is very silent in action, is carried on ball bearings and has few parts, these being strong and fully protected from dust and grit.

The rear axle is rectangular and semi-floating, 3 3/4 in. in diameter. Two sets of brakes operate on rear wheel drums, each brake being 24x3 in.

Front springs are 48x3 1/2 in., rear being 64x4 in. Springs guaranteed. The front axle is nickel steel with roller bearings on spindles and knuckles. Control is from left side. Steering is by Ross worm and nut type.

The frame is of pressed steel, 9-in. section. Tires in front are 36x6 in. solid,



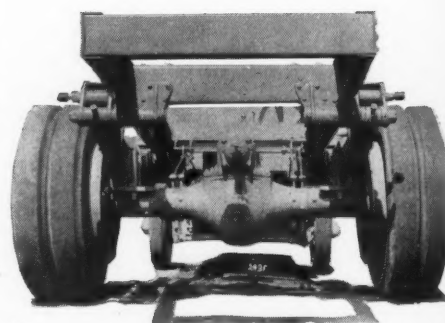
Sectional View of Worm Drive

This worm drive is silent in action and good for fifty or more thousand miles without decrease in efficiency. It is mounted on ball bearings.



Side View of New Five to Six-Ton Model B. A. Gramm's Truck

The wheelbase of this model is 168 in.; tread, front, is 70 in.; rear, is 72 in. Loading space is 162 x 42 in.



Rear-End View of Truck

This illustration shows the heavily constructed rear end, including axle, frame, springs, etc

rear being 40x6 in. dual. Chassis weight 8000 lbs.

Included in equipments are full set of tools, jack, horn, lamps and Hub-odometer. The price of chassis only, painted to order, f.o.b. Lima, Ohio, is \$4300. Generator, electric lights and large battery costs \$100 extra. With electric starter above costs \$200.

The CCJ has most advertisers because it gives them biggest returns

An Uninterrupted Truck Service the Result of Cleanliness

Proper Attention to Mechanical Parts of the Truck Keeps Fleet of Machines in Continuous Service—From Seventy to Eighty Per Cent Saved in Hauling Costs

By ALBERT G. METZ

MUCH has been written and said regarding the absolute necessity of systematically inspecting the running gear of the truck, so as to keep the latter out of the repair shop for as long a period of time as possible, but with all these admonitions and gratuitous advice given by the agent and manufacturer, how many concerns to-day give their motor truck equipment the proper care and attention it should receive? Possibly, about one out of a dozen. This condition is especially noticeable where the trucks are cared for by the owner or his employees, or possibly by the driver himself. It is true that many attempts are made in the beginning of the truck's career to keep it constantly cleaned and all bearings well lubricated, but gradually as the newness of the thing wears off the periods of cleaning and inspection become less frequent, so that after a year or so of service, only the most vital parts of the truck are given attention. That this lack of attention sooner or later results in the truck being relegated to the repair shop is evident, and consequently the manufacturer and agent are called to task for the apparently poor showing the truck is making. The result is another black eye for the truck, with strong inclination on the part of the owner to go back to horses. And when interviewing concerns like this, it takes but a glance to see that the blame bestowed upon the truck maker should be placed squarely upon the shoulders of the owner himself. The very appearance of the trucks, the manner in which they are driven, the lack of proper inspection and cleaning, taken together, is

plain evidence of the indifferent attitude the owner displays toward this twentieth century transportation unit.

It is also astonishing to learn that there are still a large number of business houses who, although using the most up-to-date methods in carrying on their business, pay very little attention to systematizing their truck delivery system, and place this part of the service in hands that are all but fitted or competent for the job. Such concerns as these view their motor truck installations as a necessary evil and are always ready to throw cold water on the truck proposition.

There are, however, some companies who are not only thoroughly convinced that commercial cars are the only solution of the transportation problem but who also give their machines proper attention—the same as any other piece of machinery used in their shops is given. One of the most interesting examples of proper supervision is that given to the fleet of trucks in the service of the Victor Talking Machine Co., Camden, N. J.

The history of this company's use of trucks dates back to July 26, 1910, when a Packard 5 ton was placed in service. Previous to that day horses were used and these were furnished on contract at so much per day. Mr. H. P. Haun, who had the contract to do the Victor Co.'s hauling with his teams, was asked to take charge of the new form of delivery, and he accepted. He knew what the horses could do and he made it his business to find out what the trucks could do. That trucks have proved their worth is illustrated by the fact that at the present time there are

four 5-ton Packards and eight 3-ton Pierce-Arrow trucks in operation—every one of them giving top-notch service by being kept in first-class running condition; and as the business grows more machines will be added to the fleet.

Probably the best recommendation that Mr. Haun can give for trucks from actual figures is that they save from 70 to 80 per cent. over the cost of doing the same work with horses. He figures that on short hauls one machine will displace two teams, while on long hauls three teams. During the first year trucks were in service an accurate account was kept of all items of expense connected with the maintenance of the machines then in service. The first year's report proved the efficiency of the truck service so well that a detailed cost accounting system was dispensed with, and only a weekly report is now made up of the amount of gasoline and oil consumed, miles per day made by trucks and what driver and helper worked on the truck.

Trucks Do Much Short-Haul Work

The particular conditions under which these trucks operate necessitates many short hauls, say from five to six miles a round trip. The longest round trips made are from ten to twelve miles. The short-haul work, done by a few of the machines, is principally between the various plants of the company and consists of hauling raw stock and parts from one plant to another. It is interesting to note that the machines are never run empty on the return trip. The work for them is laid out in such a manner that there is always some material to bring back.



Pierce-Arrow and Packard Trucks Used by Victor Talking Machine Company, Camden, N. J.
Twelve machines in all are used. The low, flat building right in back of the trucks is the shed in which the trucks are garaged

The CCJ leads in circulation, advertising and prestige

The machines are never idle. This makes the short-haul work profitable and should furnish "food for thought" to those concerns that think large truck units or trucks in general are only advantageous in long-haul service. The secret lies in keeping the trucks busy and this Mr. Haun surely does. On all trucks, except the coal truck, two men, a helper and a driver, take care of loading and unloading. One of the trucks in the fleet is kept on the go night and day, being worked by two sets of drivers and helpers. This truck has been in service over a year, and has not as yet seen the interior of the repair shop. But this is not by any means a record when comparing this performance with that of the first truck this company put into service.

This first machine holds the record of over five and a half years continuous continuous service without once being laid up for repairs.

Cleanliness and Careful Driving

This seemingly marvelous record is due primarily to the daily attention that these trucks are given. What impressed the writer most was the condition in which the power plants of these machines were kept. On being told by Mr. Haun that the machines were given a half hour's cleaning by the driver and helper each morning, it was naturally surmised that this work was more or less superficially done, as is usually the case. A glance under the hood of the five and a half-year old truck revealed a sight that was a distinct surprise. Instead of gazing at a power plant covered with about a quarter of an inch of grime and grease, with oil leaking out here and there, the writer beheld what appeared to be a brand new engine. "When did you put in the new engine?" was asked "Why, man alive," replied Mr. Haun, "that's not a new engine, that's the self-same engine that's been in the truck since she was first put into commission. That's the way they all look." And then came more



One of the Victor Trucks Carrying a Typical Load of Talking Machines

In clear weather, with top off, this machine carries half a load more than with top on

surprises. After examining every one of the machines in the yard at the time, about ten of them, the statement made by Mr. Haun was substantiated. The engines fairly glistened all over. All highly polished parts looked as if they just came from the factory, in fact, the engines reminded one of show time—even the crank cases showed not a speck of dirt. And, last but not least, the sod pan—this actually was so clean that a pin could easily be found in it.

Although this sort of treatment to a truck may seem fastidious to some—the results achieved in this case give sufficient evidence that cleanliness, even with a truck engine has its virtues. It may also be said that the drivers take a personal interest in

their machines and vie with each other in keeping their machines in first-class condition. Mr. Haun states that the driver is the big factor in a motor truck installation, and has found from experience that the man who formerly handled the reins makes the best truck operator. All his men formerly drove horses.

Tops Are Removed in Clear Weather

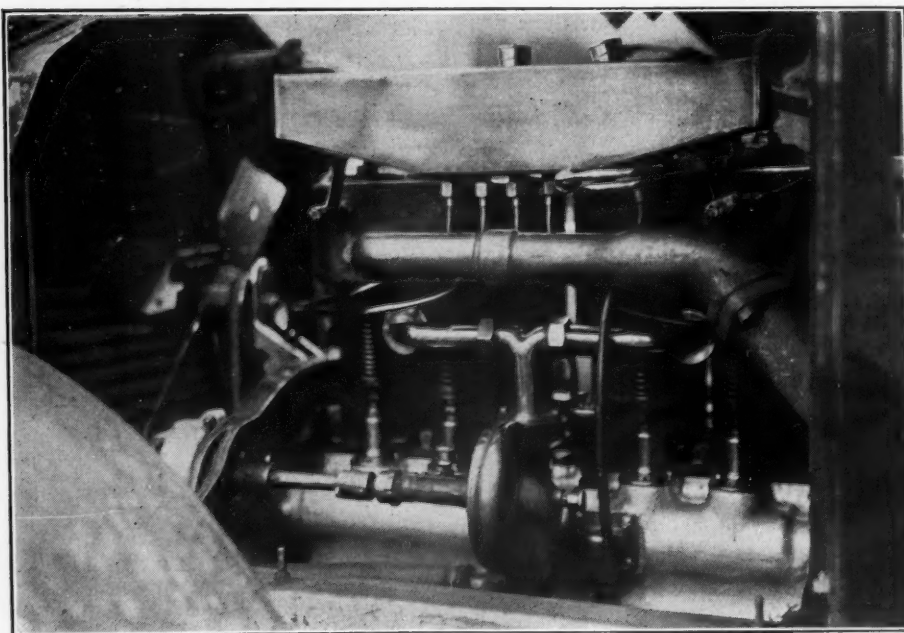
As will be noticed from the accompanying illustrations, a variety of sizes of bodies are used. All of the bodies, however, are of the same general design—that is stake and slat sides with removable top and side curtains. The tops are put on in rainy weather, and it takes but five minutes' time for two men to either remove or put on a top.

The advantage of taking off the tops in clear weather is that eighteen talking machines can be carried on one load, whereas only twelve can be carried with tops on.

The tops when not in use are kept out of the way by suspending them from the ceiling of a garage by means of a very simple contrivance. It consists of two long, square, wooden poles fitted with hook eyes at both ends. A couple of pulleys are fastened to the ceiling from which ropes hang, having hooks fastened to their ends. When a truck comes in to have a top put on, the top, which is resting on the aforementioned poles, is let down onto the stakes which are fitted with sockets to receive projections fastened to the top. After the poles are unhooked and the top is in place the poles are hooked up and pulled up against the ceiling.

The coal truck does nothing but haul coal from the wharf, all day long. It hauls on an average of 100 tons a day.

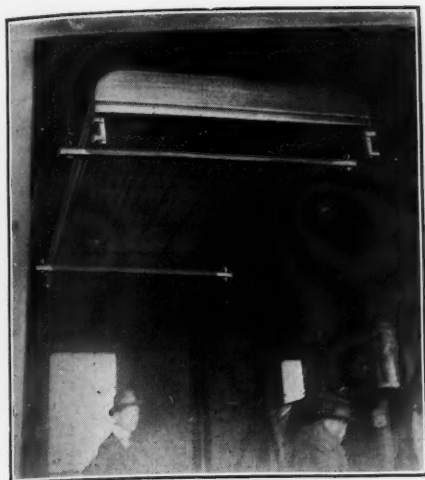
Each of the trucks in use average about 300 miles per week. Gasoline consumption figures about four miles per gallon. This



Reproduction of an Unretouched Photo, Showing Clean Appearance of the Engine

Note the clean condition of the crankcase. All highly polished parts are kept in the same condition as they were when the truck was first put into service

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers



Arrangement for Keeping Top Out of the Way During Clear Weather

average could be bettered but for the fact that the trucks are required to do a great

CLEVELAND BELL TELEPHONE TRUCKS MOST UNUSUALLY EQUIPPED

The progressive spirit of a public service company was never more exemplified than is shown by the accompanying illustration of a fleet of three White trucks just placed in service by the Cleveland Telephone Co.

These trucks are equipped with an especially designed body for use in the construction department of the company, and will be of great assistance in further extending one of the most modern telephone plants in the United States.

The trucks are so designed that the many and varied items of delicate material may be carried in bins and compartments in the most orderly manner, both sides being fitted with compartments, bins and drawers.

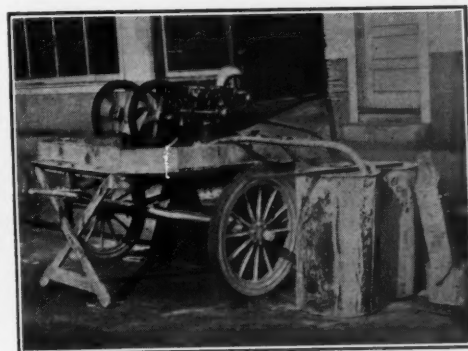
Provision is also made for the carrying of all necessary tools and construction apparatus in a position that makes it easily accessible for the workman to get either tools or material as required when on the job. Time formerly lost in not having the proper tool available, or all the required material on the job, or time spent in locat-

deal of backing at the wharves and in some of the buildings.

Occasionally the machines are required to do some special jobs, in which instances quite a decided saving is made both in money and time. In one particular case it was necessary to haul a heavy casting to one of the factories. A windlass was placed on the truck and by means of long skids the casting was pulled upon it. The actual cost for the job was about \$2.50. A year previous a similar job was done for the company by an outside party—a horse outfit was used—the job cost \$35.

GAS ENGINE ON PAINTER'S TRAILER

A painter and whitewasher, who makes use of the spray system for covering walls, has designed an outfit for economical handling of his power plant, a small gas engine. Mounted upon a trailer, composed mainly of two small car wheels, the engine and paint cans are towed to the job behind the



Small Trailer Useful

For carrying the whitewashing engine and outfit while the car is used elsewhere

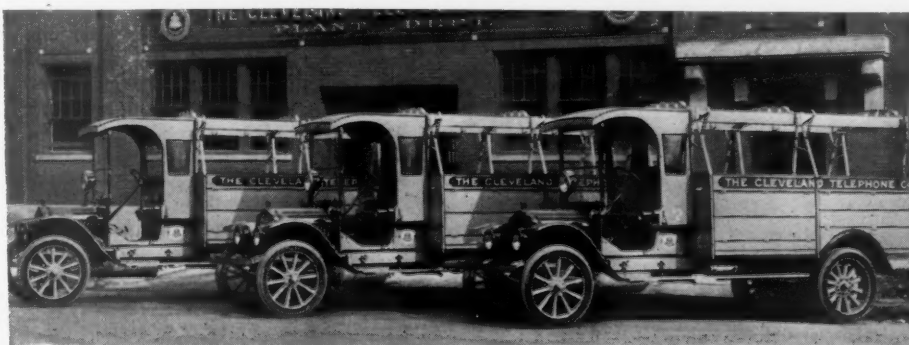
painter's auto. Arrived at the structure which requires attention, the painter adds a light trestle to the trailer to keep it in position, and detaches his auto from it. The paint can and hose are adjusted, the gas engine started to operate the pump, and the spraying process begins.

ing material, is practically eliminated by the use of these machines.

They are provided with the most modern equipment that it is possible to find in telephone service to-day. So completely have the details been figured out that even provision for carrying the workmen's lunches and "First Aid" kits is made.

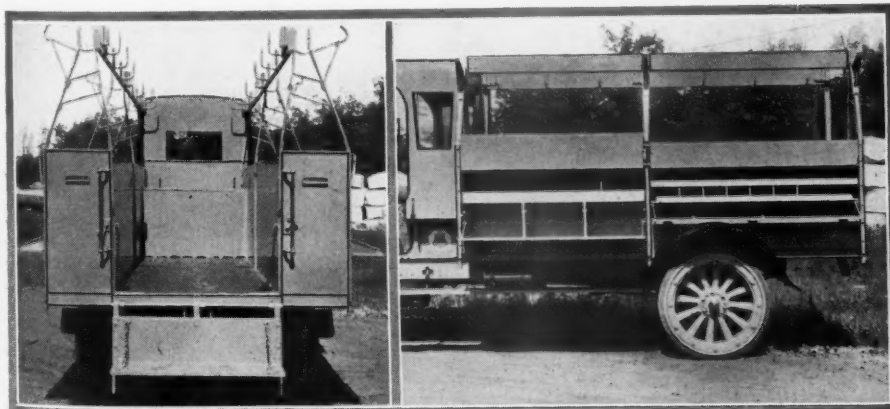
Special brackets for the carrying of pike poles and ladders have been fitted. A place has also been made for the carrying of a tarpaulin during the winter months or in bad weather. Curtains have been fitted to completely house in the driver's cab.

In addition to the two racks and side compartments there is a live loadcarrying



Fleet of Three White Trucks With Novel Equipment

These machines have just been put in service by the Cleveland Telephone Company. Everything can be carried in most orderly manner, including all tools. Each truck is fitted with a trailer coupling and front bumper; also special searchlights for examining poles, manholes, etc.



Views of Compartments and Equipment of Cleveland Bell Telephone Truck

The tailgate, when let down, forms a step for the rear of these White trucks. At the side are numerous compartments for the various things which must be carried, space being provided for small tools and everything required, even including a special compartment for the workmen's lunches. All is arranged with an idea of get-at-a-ble-ness.

space in the body of the truck that is available for carrying wire, reels and other bulky materials. Another feature is the tail gate, which has been so arranged that, when opened, it provides a step for the workmen to enter the body.

The trucks have been designed with a trailer coupling and a front bumper. Searchlights have been placed in front of the drivers. Some of the advantages of the searchlight are that if it is necessary at night or in times of other emergencies, which in telephone work are occasioned by winter storms, this light may be directed to the top of a terminal pole or to the bottom of a manhole, or thrown on a cable line without changing the direction of the truck.

A new 'bus line is being operated between Roanoke and Salem, Va., by Jack Seegar, who uses a large 7-passenger Packard car for this service.

The CCJ has most readers because it gives most information

An Interesting Analysis of a Baking Company's Motor Delivery Service

General Baking Company's Federal Averages for Month,
46.53 Miles Daily, With 39 Stops, at Cost of \$6.74



IT was during the latter part of last winter, when snow was still on the ground, that the steady work done by the General Baking Co.'s Federal truck in Cleveland and the smaller towns bordering that territory attracted the attention of the Federal Traffic Engineers—for here were weather and road conditions that would ordinarily be hard to cope with. Consequently an analysis was started, covering the work done by this 1½-ton Federal for over a month. All winter long the truck made its deliveries at Willoughby, Ohio, about twenty-five miles outside of Cleveland, arriving each on schedule time—8.15 a.m.

Before using a commercial car on this suburban route all the bread was shipped by express. That was expensive—the re-handling and returning of crates was a serious inconvenience—and the value of personal contact with the merchant was absolutely lost.

But now, with the trucks, deliveries are more dependable, more economical, more convenient, and the merchant and sales-

man meet each other every morning in the store. The salesman's personal contact helps considerably to increase sales for all concerned, he helps wherever he can, ar-

Analysis of Wholesale Delivery of Bakery Products

Friday, April 30, 1915.

		Trip No. 1	
		Hrs.	Min.
Standing Time:			
On trip	4	33	
Average time per order		8.27	
Average time per stop		7	
Running Time:			
To first stop		21	
Between first and last	2	37	
From last stop		16	
Total	3	14	
Total of standing and running time	7	47	
Mileage:			
To first stop		5.10	
Between first and last		37.12	
From last stop		2.87	
Total mileage		45.09	
Average distance between stops		.98	
Speed:			
To first stop		14.57	
Between first and last		14.18	
From last stop		10.76	
Average		13.92	
Delivery:			
Orders		33	
Weight		1600 lbs.	
Stops		39	
Average weight per order		48.48 lbs.	
*100 lb. miles		360.7	
*This delivery unit is obtained from the expression:			
Total weight carried	X	Miles traveled	
100		2	

Daily Service Record Analysis

As the daily service record and recording tape are received a complete analysis is made of the day's work in the above form.

ranging the bread so as to keep the percentage of "stale" at its lowest possible point.

The basis of all the calculations which follow, is the Daily Service Records and Recording Tapes. It is through the earnest co-operation of the General Baking

Co. that a Service Record was returned each day to the Federal Traffic Engineering Department, together with the recording tape. From these the daily analysis was made.

Although the truck used is of 1½ ton capacity, the weight carried at the present time does not require the full capacity of the truck. The baking company is developing this territory so that this truck will operate under capacity average loads. Even as it is, the truck shows a remarkably good record.

		Hrs.		Min.
Standing Time:				
On trip	4			50
Average time per order				10
Average time per stop				7½
Running Time:				
To first stop				27
Between first and last	2			54
From last stop				11
Total	3			32
Total of standing and running time	8			22
Mileage:				
To first stop				5.51
Between first and last				38.75
From last stop				2.27
Total				46.53
Average distance between stops				1.019
Speed:				
To first stop				12.22
Between first and last				13.35
From last stop				12.38
Average				13.18
Delivery:				
Orders				33
Weight				1545 lbs.
Stops				39
Weight per order				46.8 lbs.
100 lb. miles				359.44

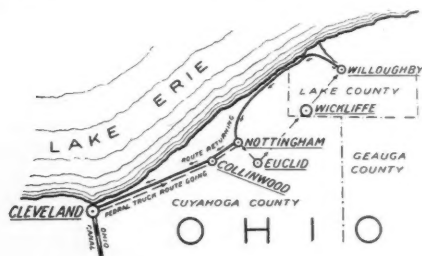
Average Analysis

The summary of daily results of over one month showed the above figures

There is a steep hill near Willoughby, Ohio, right on the route that the General Baking Co.'s truck travels. Four horses are required to haul a load up this hill, and when the roads are bad, the struggling efforts of horses are nothing short of pitiful. But with the truck no trouble at all is experienced.

Weaver-Brownlee Co., 1820 E. 13th St., Cleveland, Ohio, has been taken over by the Fred P. Brand Motor Co. Mr. Weaver will be identified with the new company in a sales capacity. Pierce-Arrow cars and trucks will be handled exclusively in Cleveland and eastern Ohio by this concern.

Pike's Peak Highway Association will promote the greatest hill climbing event the world has ever seen over seventeen miles of road from Cascade to the top of Pike's Peak. This national hill climb will be held some time next year. One feature of the program, which will cover several days of competition, will be a truck contest. Stanley C. Wilson, secretary of the J. C. Wilson Co., manufacturer of the Wilson worm-drive truck, has suggested that one event at least be for trucks fully laden to their capacity load. Safety walls of concrete are to be constructed around the turns owing to the danger of going over precipices. The altitude at the top is 14,000 ft. and at the bottom 6000 ft. making a climb of about 8000 ft. in 17 miles.



Map of Route Covered by Federal

This shows the enormous possibilities that lie waiting for the baker who wants to extend his sales.



Federal Truck Used by General Baking Company

The CCJ has most advertisers because it gives them biggest returns



Motor Truck Design and Construction Made Plain Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the twentieth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

PART XX

THE POWER PLANT ARRANGEMENT AND ITS MOUNTING

A FEATURE of commercial car design which merits careful consideration is that of mounting and arranging the power plant in such a manner as to offer to the user power plant accessibility and life, in the greatest degree consistent with reasonable compact design. Mention was previously made of the tendency to obtain perfect alignment for the engine, clutch and transmission under the most severe conditions, also the advantages of a flexible mounting to protect these units from frame stresses due to frame weaving. Vibration is another factor of considerable magnitude that must be considered.

Alignment and Flexibility

Perfect alignment is obtained in vehicles up to 4000 lbs. capacity by mounting the transmission in a unit with the engine, this construction being termed a unit power plant. Flexibility is obtained by mounting this unit on three points of support, usually two rigid points on the main frame and the third flexible point on a cross member. A similar mounting is also employed when the engine and transmission are supported by a sub-frame.

The subject of vibration suggests the supporting of the engine on a frame having a spring support, relying upon the

springs to absorb much of this vibration. With pleasure vehicles, the vehicle springs are relied upon to absorb this, however, commercial car springs are much heavier and are not near as resilient as pleasure car springs. The transmission if mounted on the main frame is generally provided with a three point support, permitting a certain degree of flexibility. Past experience has taught commercial car builders that main frame mounting cannot be successfully resorted to, unless combined with a support which provides a certain degree of flexibility.

The rigid sub-frame is rapidly being replaced by a flexible construction and in a few cases provided with springs at all points of support.

The advisability of providing a long life for the power plant will be endorsed by all users and since this feature is a thoroughly practical one, which can be accomplished with little added expense, it is a step toward reducing the maintenance cost. There are very few commercial car builders at present who do not provide for a certain degree of flexibility in the mounting of the power plant.

A few contend that there is little to be gained through this feature, however, it is not to be denied that for certain classes of truck work, this system presents some advantages.

Readers of the Commercial Car Journal no doubt are thoroughly familiar with the rigid mounting, however, reference may be made to the Reo frame, Fig. 2 of the

preceding chapter, which shows a rigid sub-frame for carrying the engine and transmission. In this vehicle the sub-frame is set at angle to obtain a straight line drive and as the vehicle is equipped with pneumatic tires and designed for delivery work, little can be gained by adding a flexible construction. Universal joints are relied upon to compensate for the momentary misalignment.

Flexible Mountings

One of the most prominent types of flexible mountings is shown in Fig. 1, which may be adapted to either the engine, or a unit power plant, although it is especially advantageous in the case of the unit power plant. In this construction two cast arms integral with the flywheel housing form the two rigid points of support. These are either bolted down on a sub-frame or set on hangers riveted to the main frame, with bolts passing through both to hold the power plant in position. The third point of support is at the front end of the engine and consists of a bracket fitting over a finished surface on the hub extension of the gear cover plate. A cross member of the frame passes under this and has the bracket fastened down to it by two bolts.

This three-point suspension or mounting may be best explained by reference to a three-legged stool which will stand securely on an uneven floor, whereas a four-legged one will not. Applying this theory to the commercial car, we can readily see

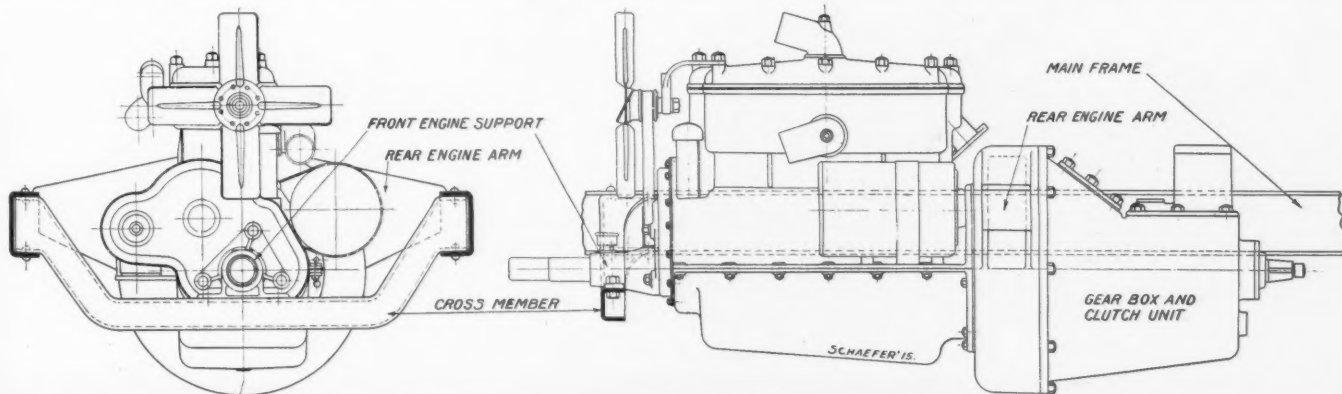


Fig. 1. Unit Power Plant Suspended on Three Points

This flexible mounting may be adapted to either the engine or a unit power plant, although especially advantageous in the case of the latter

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that should the frame be distorted, it will not subject the supporting arms of the power plant to any stress, whereas with four-point mounting, the rigidity of the crankcase and the supporting arms would resist the distortion of the frame, hence, severely stressing these parts by distorting influences. Excessive road strains on the frame have been the cause of many broken supporting arms.

Peerless Mounting

Another type of three point main frame mounting is shown in Fig. 2, being employed on the Peerless trucks for the mounting of the engine. In this construction a heavy cast steel member is bolted to the crankcase by studs which also hold the rear main bearing cap in place. At the front a cast steel member is pivotally arranged in a steel bracket bolted to the top of the crankcase. Both of these supporting members extend to the frame side rails and are bolted to them. With this construction the stresses on the rear supporting members are not placed directly upon the aluminum crankcase.

A similar method of mounting the engine is also used on the Pierce and Locomobile trucks.

Either of the above mentioned constructions are adaptable to either the engine or power plant mountings, both types being quite popular.

Flywheel Housing

One of the chief difficulties encountered in combining the engine and the transmission in a single unit is due to the fact that the flywheel is located between them and to enclose it requires a great deal of metal, adding both to the weight and the cost. In commercial car practice the four-cylinder engine seems to have become the standard and with these there is a tendency to use a flywheel of inadequate capacity, when it is to be enclosed, which detracts somewhat from the steady running qualities of the vehicle. To overcome this, two expedients may be resorted to. One of these is to place the flywheel at the front of the engine, but there

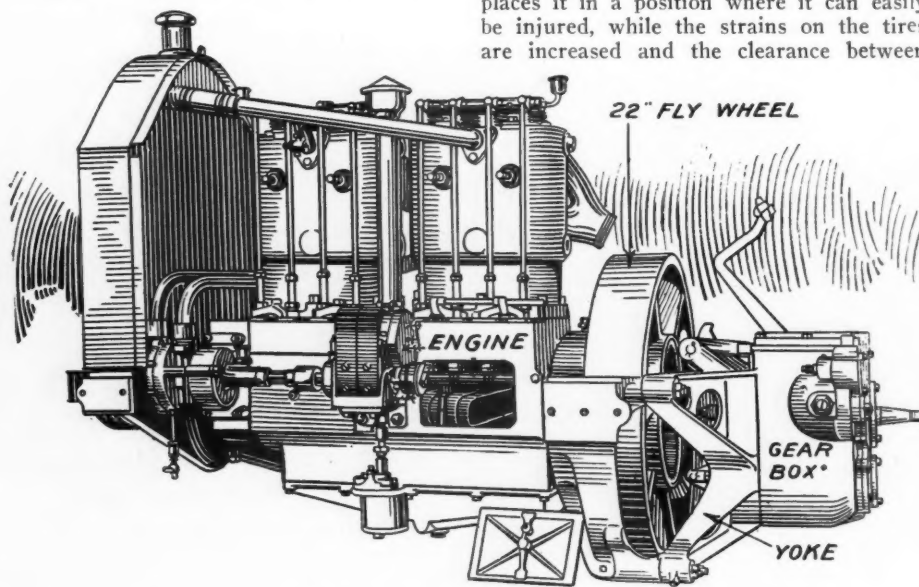


Fig. 3 Dorris Unit Power Plant

This design features an open flywheel and the engine and transmission are joined by a large yoke, which permits the use of a large flywheel

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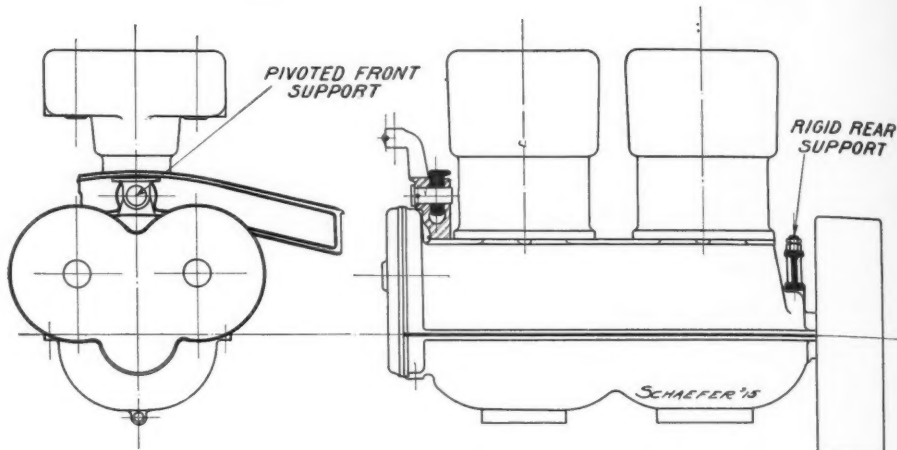


Fig. 2. Three-Point Main-Frame Suspension

This is employed on Peerless trucks for the mounting of the engine. With this construction, the stresses on the rear supporting members are not placed directly upon the aluminum crankcase

are a number of objections to this practice. The purpose of this flywheel is to equalize the torque of the engine before it is transmitted to the transmission and its logical

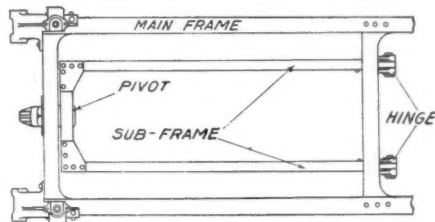


Fig. 4. Mogul Power-Plant Mounting

The frame has a front cross member, which carries a bracket to form the bearing for the third point of support

place therefore seems to be between these two units. The forward location also places it in a position where it can easily be injured, while the strains on the tires are increased and the clearance between

the engine and front axle are materially reduced.

On the Dorris commercial cars all the features of an open flywheel are retained as illustrated in Fig. 3 by joining the engine and gear box by a large yoke, which permits the use of a large flywheel and also effects a considerable saving in weight.

The same principles of unit plant mounting may be applied to vehicles in which the engine or both engine and transmission are carried on a sub-frame. Fig. 4 illustrates this feature applied to Mogul Trucks. The frame has a front cross

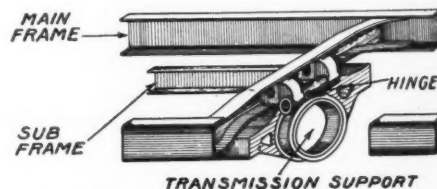


Fig. 5. Three-Point Suspension of DeKalb Subframe

In this case the hinge is placed at the front end of the subframe members

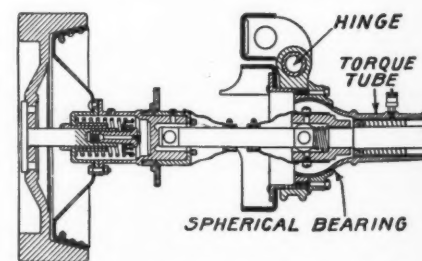


Fig. 6. DeKalb Subframe and Transmission Support

This also illustrates the method of supporting the front end of the transmission

member which carries a bracket to form the bearing for third point of support. The sub-frame is also provided with a cross member and a bearing bracket, so that a hollow pin can be inserted. This is retained by a large unit, having a hub, which together with the pin forms the bearings for the starting crank. The rear ends of the sub-frame form a hinge suspended from the frame cross member.

DeKalb Construction

A similar construction, Fig. 5, is used on the DeKalb commercial cars. However,

in this case the hinge is placed at the front end of the sub-frame members, while the rear end has a large drum which forms a single hinge. Fig. 6 illustrates a sectional view of this and also illustrates the method of supporting the front end of the transmission from this point. This transmission is bolted to the jackshaft and has long torque tube extended to this third point of support, which is of spherical form.

The method of mounting the engine in the United States motor Trucks is illustrated in Fig. 7. The engine is mounted on a sub-frame, the front cross member of which extends into side members of the frame. This cross member has ends which form a yoke, into which are placed heavy coil springs, retained by a long bolt, passing through a bracket riveted to the frame. These coil springs relieve the engine of severe shocks and vibration. At the rear end of the engine is riveted to the sub-frame a cross member which forms a

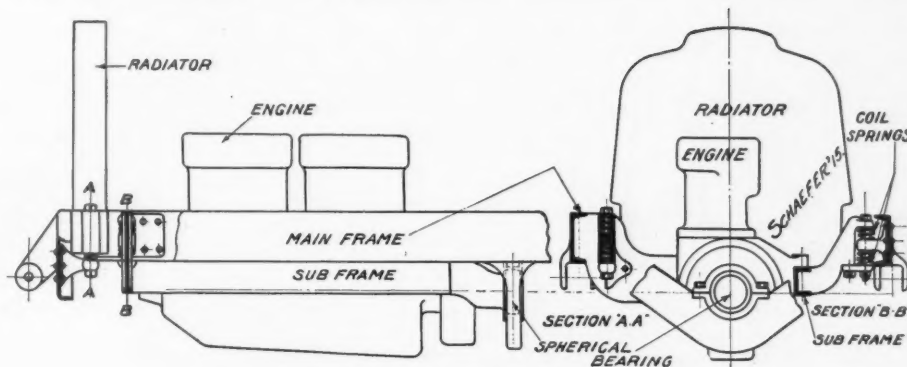


Fig. 7. U. S. Power-Plant Mounting

The engine is mounted on a subframe, the cross side member of which extends into side members of the frame

carries the radiator, gasoline tank and driver's seat. The construction, in addition to protecting the power plant, also provides a more comfortable seat for the operator.

having cross members at both ends, which are dropped considerably at their center. The front cross member has two pressed steel brackets, which rest on heavy coil springs placed inside of the front cross member of the main frame. Another spring is placed below the flange of this cross member, a bolt being used to hold both springs in position. In this way the movement of the forward end of the sub-frame is controlled in both directions. The rear support is formed by brackets riveted to the sub-frame members which have a ball-shaped end that rest on ball sockets, placed within a bracket riveted to the main frame members. These ball sockets are provided with springs, to relieve the power plant of shocks due to vibrations, while the ball ends permit a certain degree of flexibility when the frame twists. In reality this is a four-point suspension, which retains all the features of a three-point suspension.

Blair Three-Point Suspension

The principle of three-point suspension in the Blair trucks, Fig. 10, is even carried onto the rear axle. In this construction, the sub-frame is hinged to the main frame in front by means of steel castings and heavy hardened and ground steel pins and at the rear it is hinged at right angles to the worm drive axle housing. It is claimed that this system renders the sub-frame which carries the power plant, flexible to any position, maintaining perfect

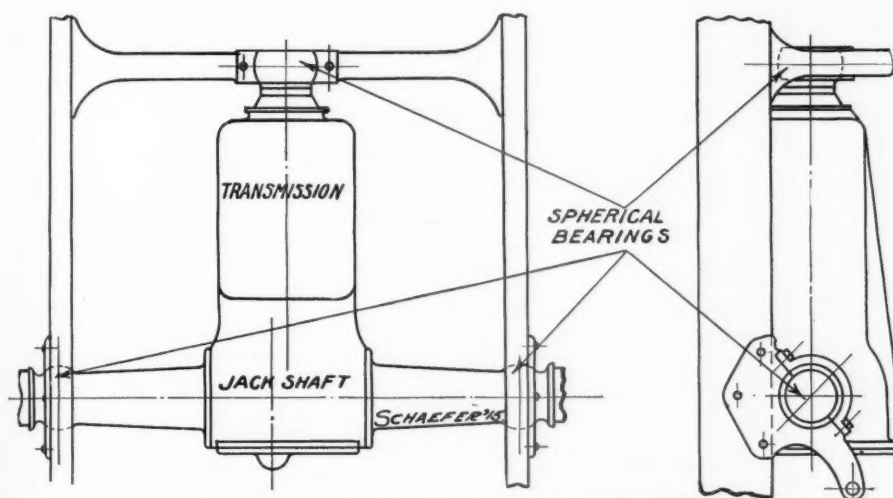


Fig. 8. Method of Mounting U. S. Transmission

This shows a spherical bearing at its three points of support

5-in. spherical bearing for the rear support, on a large cross member, being dropped considerably in the center. The support is on the upper side of this cross member, thus the engine has a very flexible mounting, being relieved of vibration and the stresses due to main frame twisting when the road wheels mount an obstacle in the road.

Flexible Mounting of Transmission

This feature of flexible mounting is also applied to the transmission as shown in Fig. 8, which has a spherical bearing at its three points of support, a large dropped cross member being used at the front end, while the two spherical bearings at the rear are formed over the jackshaft housing.

In the Stearns-Knight five-ton truck the power plant is also carried on a sub-frame, having a hinge support on a cross member back of the transmission, while the front end is mounted on semi-elliptic springs independent of the main frame and springs of the truck itself. These springs are anchored at their centers to a bracket on the sub-frame, the ends of the spring rest on brackets extending from the main frame. This sub-frame also

The larger size KisselKar Trucks also have the power plant mounted on springs at both ends, with provision for flexible mounting incorporated in the rear supports, as shown in Fig. 9. The engine is mounted on a pressed steel sub-frame

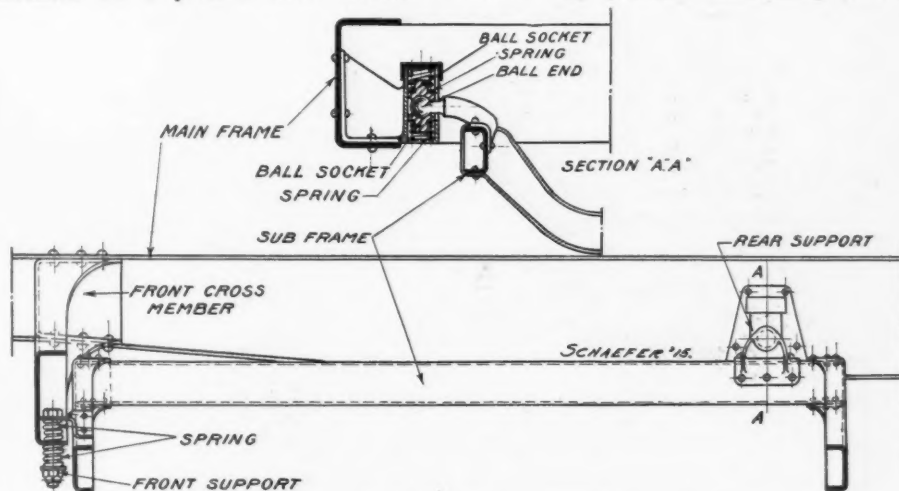


Fig. 9. KisselKar Six-Ton Subframe Mounting

The engine is mounted on a pressed-steel subframe having cross members at both ends, which are dropped considerably at their centers

The CCJ has most readers because it gives most information

alignment in the transmission of power. It provides a straight line drive under all conditions and entirely eliminates universal joints in the drive. However, the writer opines that vibration and frame deflections may offset the above advantages.

In some cases where main frame mounting is used, the engine or power plant has a flat surface which is bolted down to the front cross member of the frame with two bolts located about 3 to 6 in. apart. This construction is often termed a three-point support, however, it is not quite correct to speak of this as a "point" of support. In such a case there are really three or four supporting surfaces instead of three or four points of support and it can readily be seen that if the surfaces of a three-point support are fairly large, there must still be considerable strain near the supporting surfaces when the frame is distorted.

As mentioned above, the Reo three-quarter-ton truck has a rigid sub-frame con-

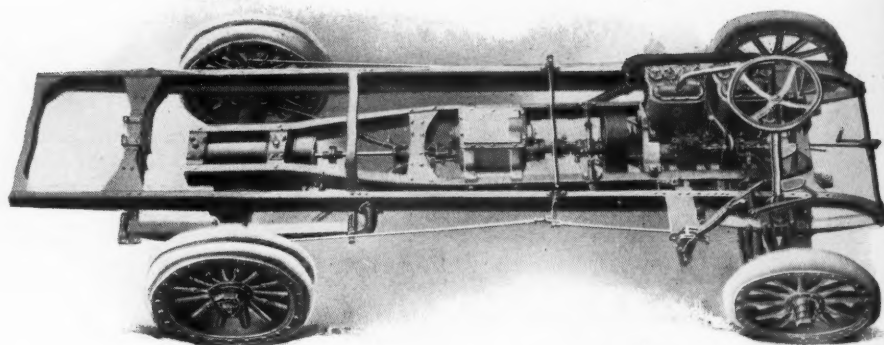


Fig. 10. Power Plant Mounting of Blair Worm-Drive Truck

In this construction, the subframe is hinged to the main frame by means of steel castings and steel pins

struction, which is set at a slight angle, which lends itself to that form of construction known as a straight line drive, that is such an arrangement of the different units, that when the vehicle carries a normal load the engine crankshaft, transmission primary shaft and propeller-shaft

are in a straight line. Under these conditions motion can be transmitted uniformly, especially with one universal joint, as this provides a relative large distance between the universal joint and the rear axle, so that the play of the body springs has little influence on the drive.

OWNERS AND DRIVERS STUDY GARFORD TRUCK CON- STRUCTION

Fifty owners and drivers of Garford trucks assembled at the salesrooms and service station of the Garford Philadelphia Co., 2308-10-12 Chestnut St., Wednesday evening, October 20th to study the construction and operation of the worm axle such as is used on the Garford model "75" 1-ton truck. R. E. Chamberlain, manager, opened the meeting with a short talk showing the benefits of the meetings by being instructed on each part by the most capable men of the different departments. It is the object to hold meetings of this kind every month.

Mr. Chamberlain introduced E. A. Shelly, of the Sheldon Axle and Spring Co., of Wilkes-Barre, Pennsylvania, where the axle of the Garford model "75" is made.

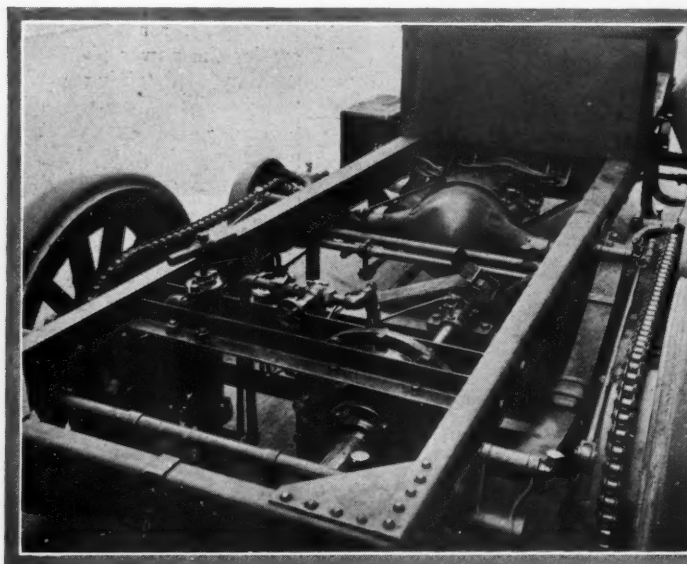
Mr. Shelly went into the details of the worm axle, giving its history from the start, saying that it was first perfected in England and then brought to this country, the Sheldon Axle and Spring Co. being the first to take it up here. He showed the advantages in efficiency and service of the ball type of bearing used in the Sheldon axles. A Garford "75" was placed in the room for inspection and the entire rear system was taken apart to show exactly how the oiling is taken care of. Each part was taken out and explained and the men were shown what work it did and just how it did it in conjunction with the others. The differences between the semi-floating axle and the full floating were explained together with the advantages and disadvantages of each on the truck where there is great skidding load or strain as well as the straight rolling load.

Mr. Baumgardner, Assistant Chief Engineer, of the Sheldon Axle Co., was also

present and along with Mr. Shelly very cleverly and plainly answered all the questions which the different owners and drivers brought up.

Mr. Woodruff, of Strawbridge and Clothier, who is very enthusiastic over the meetings from every standpoint, showed a good point when he said, "These meetings not only educate the owners and drivers of Garford trucks but in so doing make the drivers much more competent and of more service to their employers."

Watson Wagon Co., Canastota, N. Y., has put on the market a front drive motor truck. The advantages claimed for the front drive truck are that it permits of a bottom dump instead of a rear dump. With the front drive and bottom dump, 66 per cent. of the load is carried on steel tires. The truck is designed exclusively for the use of those who are doing paving, grading, excavating or general contract work.



Truck Fitted With Centrifugal Pump

The equipment here shown is a Federal truck with a centrifugal pump, which is clearly shown in the detail at the left. Means are provided for connecting at the rear with a pipe which can be lowered into conduits and similar places and by means of the power of the truck engine, these conduits pumped out. It is in use by the Hickey Contracting Company, of New York City.

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TRUCK ACCESSORIES AND APPLIANCES

NEW TORBENSEN ONE-TON AXLE

THE Torbensen Gear and Axle Co., since locating in Cleveland, has brought out a design of axle of which the first size, a one-ton, designated model "A," is now in production.

This 360-lb. axle is the result of experience gained with several thousands of axles in use during the past three years. No radical changes from original design have been found necessary, except in the brakes, all other changes being in the nature of improvements.

This axle has a capacity of 3500 lbs., including truck and load on it. It is 56 in. tread. It takes $2\frac{1}{4}$ or $2\frac{1}{2}$ in. springs with a maximum distance of $39\frac{1}{2}$ in. between them.

Beginning with the 3x2 in. drop-forged I-beam, this practically remains as before. One-sixteenth in. stock has been added to the section of the flanges, the bore at the expanded center has been enlarged, and the differential carrier is now divided along the center line of the jackshaft, with the front part of this carrier, and the rear half, each in one piece. Dividing the housing in this manner gives ready and instant access to the differential for inspection or adjustment, and also enables the latter to be quickly removed without disassembling other parts.

Larger Bevel Gears

The main improvement, however, consists in stepping the jackshaft further away from the I-beam, giving room for larger $3\frac{1}{2}$ per cent. nickel-steel bevel gears, and it will be noticed that these are very nearly twice as large as formerly.

The final gear ratios that are made up for stock are 7:1 and 8:1, but even lower than 8:1 can be secured if desired.

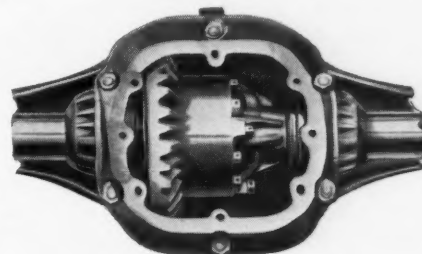
Another great improvement is that provision has been made for adjustment of the bevels in every direction, and this can now be quickly done while running under load on the testing stand. Positive locks are provided for these adjustments.

Can't Leak Grease

Still another refinement, small but nevertheless of value, is to be noted here. Formerly the tubes surrounding the jackshaft were pressed into the housing and riveted, and it was found that no matter how tightly fitted, they might eventually work loose and leak grease. Now they are merely pushed into the housing and a large and broad felt washer is laid in a pocket surrounding the tube so that, although the tube connection between differential and drums at the ends of the axle is now more or less flexible, there is no chance for leakage and it should be noted that the ends of the jackshaft tubing are similarly provided.

Perhaps one of the most interesting improvements is the method of keeping the

grease off the brakes. By reference to the cut showing end of axle, spur pinion and interior of brake cover, and also by looking at the sectional print, it will be noticed that a shield extends out from the brake



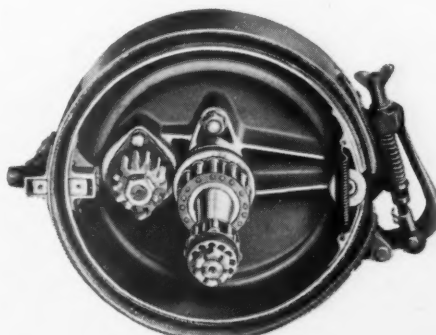
Rear View Torbensen Axle

Showing accessibility for inspection, etc., when the rear plate is removed



Torbensen Load-Carrying Drop-Forged Member

This forging is 2 by 3 in. I-section, fitted with chrome-vanadium double heat treated spindles



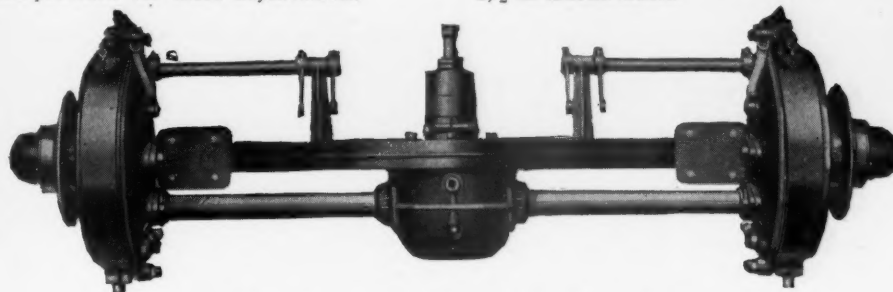
Torbensen Brakes

Showing the spindle with Bower roller bearings; the chrome-vanadium pinion, 13 teeth, $1\frac{1}{8}$ in. wide, $5\frac{1}{2}$ -7 pitch; and the internal expanding brakes, $14\frac{1}{2}$ by $2\frac{1}{4}$ in., and 15 by $2\frac{1}{2}$ in. external brakes.



Torbensen Internal Gear

The internal gear is of .50 carbon steel, 52 teeth, $1\frac{1}{8}$ in. wide, $5\frac{1}{2}$ -7 pitch



Top View of Torbensen One-Ton Axle

This shows the increased distance between the axle housing and the weight-carrying drop-forged member. Spring centers $39\frac{1}{2}$ in. apart, maximum. Tread 56 in.; capacity 3500 lbs., including weight of truck and load. Weight 360 lbs.; gear ratio 7 to 1 and 8 to 1.

nature, which by reason of the large diameter and comparatively high surface speeds, would soon wear away.

On test cars, run approximately ten thousand miles, this has been found to

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work perfectly, keeping abundant lubricant on the gears at all times, but letting none whatever escape onto the brakes.

The brakes themselves have been redesigned throughout, and act on pressed steel drums. External stroke is 15x2½ in., internal, 14½x2¼ in. They are clearly shown in the cuts and are very powerful and efficient.

Coming now to the outer driving ends, it will be seen that the jackshaft is also packed with felt washers so as to keep the grease from leaking through by the spur driving gear and into the hub.

The jackshafts of chrome-nickel double heat-treated are splined on both ends, whereas formerly they were squared at the differential end and made with a taper at the point where the spur pinion passed.

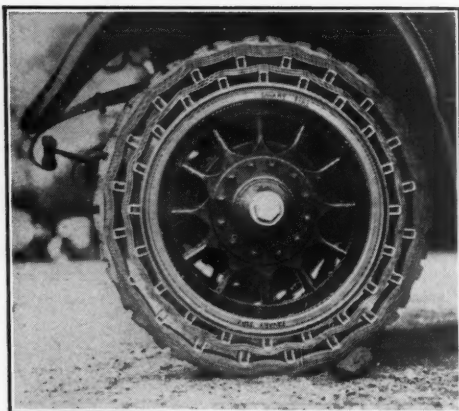
The hub itself is of large diameter, the driving or internal gear is of drop-forged steel, heat-treated to a hardness of 75 to 80 by the Scleroscope. After being heat-treated it is pressed on over the hub, which operation restores it to a perfectly cylindrical shape, if it should happen to have gone slightly out of round in the heat-treating. After being pressed on the hub, the rivet holes already in the ring gear are drilled through flange of hub, using the gear as a jig and the riveting is done by pneumatic hammers.

The standard axle now carries the brake connecting levers inside the frame of the truck, dispensing with all outside brake rods.

Block bearings are used for the differential and driving shaft, and Bower bearings in the hubs and at the end of the jackshaft.

THE NEW FAVARY MECHANICAL CUSHION TIRE IMPROVED AND SIMPLIFIED

The improved Favary Tire, made by the Favary Tire Co., Inc., Fifth Avenue, at 57th Street, New York City, has employed in it the same means of producing resiliency



Favary Special Resilient Type Tire

This tire's resiliency is produced by mechanical means entirely, using aluminum blocks and extra strong bands of fabric, the tread being block type.

as its former tire, described in our January, 1913, issue, page 32, but uses one aluminum block in place of each pair used in the outer circle of blocks, and in addition has shaped the tread higher between these single blocks by adding rubber blocks on the tread. At the first glance it would seem that the tread would wear mostly on

the high blocks, but the weight bends the fabric inwardly between the blocks, rendering the outer surface of the tread straight, for the entire distance contacting the ground.

The outer tread blocks, of rubber, and all aluminum blocks are attached to the fabric with tubular steel rivets. A special rim is furnished which can be applied to the ordinary wheels in the usual manner. The tire is hardened or softened by inserting or removing shims between rim and adjoining blocks. The fabric and rubber tread can be replaced for 25 per cent. of the first cost.

VELLUMOID SHEET PACKING

Vellumoid Sheet Packing, made by the Fibre Finishing Co., 27 State Street, Boston, Mass., has as a basis a very strong vegetable fiber which is chemically treated making it oil, water, gasoline, grease and air proof and exceedingly tough. Owing to these properties Vellumoid Sheet Packing makes an exceptional gasket for use on all oil, grease, water and gasoline connections and all places where the conditions call for a very tough and durable packing. The only place where it is not recommended is where it is subjected to a temperature over 300 degrees Fahrenheit. It contains no rubber or rubber substitute and no mineral matter. It is light in weight, very flexible and has high tensile and tearing strength. Because of its flexibility it makes a particularly tight joint and its toughness insures durability. Thicknesses range from .006 in. to ⅜ in.

McQUAY-NORRIS COMPANY NOW MANUFACTURING ALUMINUM PISTONS FOR FORD CARS

The adoption of aluminum alloy for use in pistons in a large number of the high grade cars for 1916 has brought about a demand on the part of Ford owners for a similar type of piston suitable for their cars. In response to this demand the McQuay-Norris Manufacturing Co., makers of the well-known "LEAK-PROOF" Piston Rings, is now announcing a die-cast aluminum alloy piston, completely equipped with "LEAK-PROOF" Piston Rings and suitable for Ford cars.

The pistons are made according to the French Patented Cothias Process, the

product of which is an alloy composed largely of aluminum and known to the trade as Lynite. Lynite is claimed to be lighter than aluminum, stronger than cast-iron, and is easily cast in permanent molds or dies, making an excellent finished product. The conductivity of Lynite is calculated at fourteen times that of cast-iron, which means that the amount of carbon deposit usually found on the piston head will be very much decreased. In this Lynite Piston the co-efficient of friction is about 50 per cent. less than that of cast-iron the consequence of which is higher mechanical efficiency of the whole engine, more power, a snappier, faster engine and a saving in consumption of lubricating oil.

The advantages of "LEAK-PROOF" Piston Rings have long been known to Ford

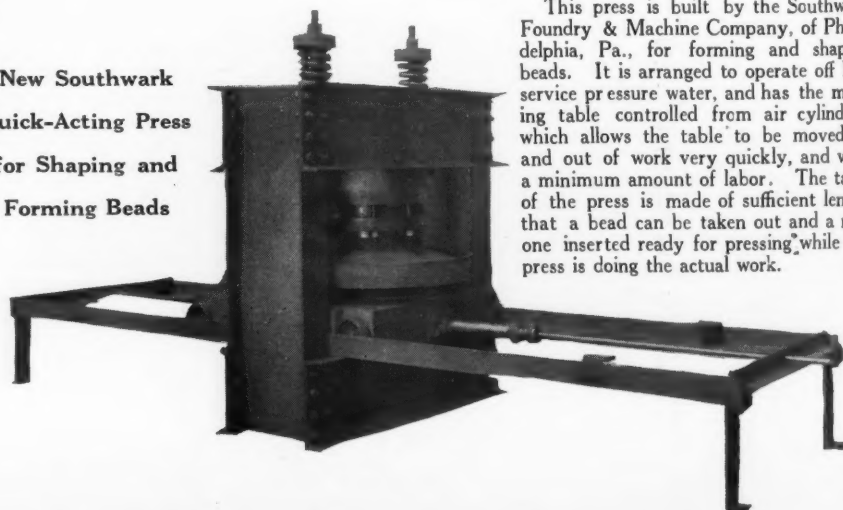


Set of McQuay-Norris Lynite Piston Rings for Ford Cars

owners, and an equipment of Lynite Pistons completely fitted with "LEAK-PROOF" Rings makes a very desirable installation from every point of view. Four Lynite Pistons with twelve "LEAK-PROOF" Piston Rings packed in a box ready for installation will sell for \$30, and since the "LEAK-PROOF" Ring equipment for a Ford Car formerly cost \$18, it is obvious what an extremely attractive price the combination can be bought for.

This set can be installed by the Ford owner himself, for the rings are perfectly fitted to the pistons in the factory before going out, and it will only be necessary for the owner to take the old pistons out and slide the new ones in. This equipment is handled by jobbers throughout the country and can be had for Ford standard size engines and Ford engines that have been rebored to .031 oversize.

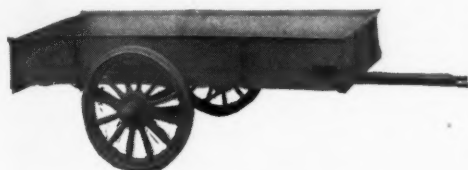
New Southwark Quick-Acting Press for Shaping and Forming Beads



This press is built by the Southwark Foundry & Machine Company, of Philadelphia, Pa., for forming and shaping beads. It is arranged to operate off low service pressure water, and has the moving table controlled from air cylinders, which allows the table to be moved in and out of work very quickly, and with a minimum amount of labor. The table of the press is made of sufficient length that a bead can be taken out and a new one inserted ready for pressing, while the press is doing the actual work.

ROGERS STEEL TRAILERS

This Rogers Indestructible Steel Trailer is made by Rogers Bros. Co., of Albion, Pa., in two sizes—model A, price \$110, f.o.b. Albion, Pa., capacity 2000 lbs., and model B, price \$80 f.o.b. Albion, Pa. capacity 1000 lbs. They are made of open-hearth steel and riveted throughout. Can be attached to truck, touring car or runabout.



Rogers Steel Trailers

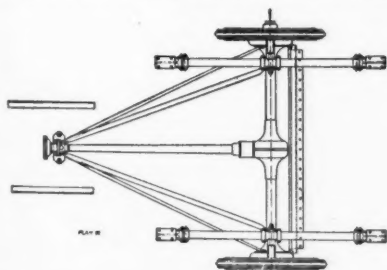
This trailer is built of steel, has semi-elliptic springs, and ball or Bower roller bearings

Model A has a body 8 ft. long, 46 in. wide, and 12 in. high. Springs are semi-elliptic, oil-tempered and heat-treated. Axles have 1½ in. square bed, and are of special steel. Bower roller bearings are used. Wheels are artillery type, 1½ in. spokes, second growth hickory. Tires are 32x2 in., solid rubber. Finish dark gray.

Model B trailer has body 6 ft. long, 46 in. wide, and 12 in. high. Springs are the same as model A. Axles have 1¼ in. bed of spiral steel. Ball bearings are used in this model, and spokes are 1¼ in. Tires are 32x1½ in., solid rubber. Finish the same color.

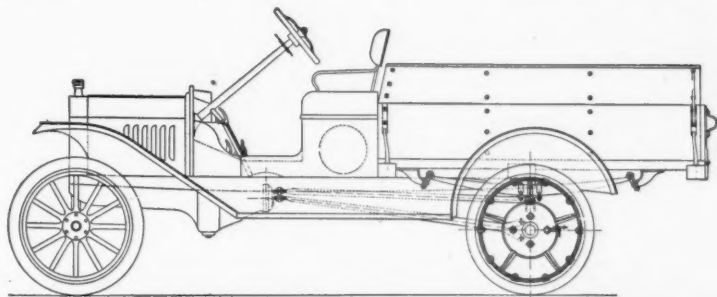
ATTACHMENTS FOR CONVERTING A FORD CHASSIS INTO A ONE-TON TRUCK

The Swedish Crucible Steel Co., of Detroit, Mich., has put on the market springs, supports and an under-gearing device for converting a Ford chassis into a 1-ton truck, or even into a tractor, some of these



Top Plan View of Truck Equipment

This illustration shows position of the long truck body springs and where they as well as the draw-bar yoke are fastened to the gear housing of the Olson wheel.



Side View of Ford Converted Into One-Ton Truck

This side view shows method of attaching the extra springs to truck body

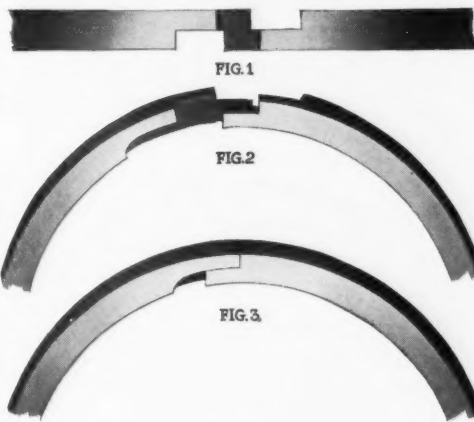
devices being to relieve the chassis of any weight or strain.

The undergearing is done by the use of planetary gears, and gears can be had to drive the wheels at speeds of 20, 15, 12, 8, 4 and 2 m.p.h. with engine running at normal speeds and driving on high gear. Thus any gearing can be had to fit the particular work which the truck is to do. All wheels are of cast steel, with bronze bushings. For tractor purposes an all steel tractor face rim is furnished, while for trucking purposes a steel rim with demountable rims is used.

A number of combinations of wheels, yoke bars for attaching trailers, truck bodies, dumping bodies, rims, tires, of wheels minus tires, or Ford chassis complete with wheels, body, demountable rims, and sets of gears for reducing ratio can be purchased, prices ranging from \$45, for truck wheels and rims for making a 1-ton chassis, to \$650 for Ford chassis with truck body, Olson wheels, rims and tires. A Ford chassis with wheels, rims and tires sells for \$475.

GILL PISTON RING

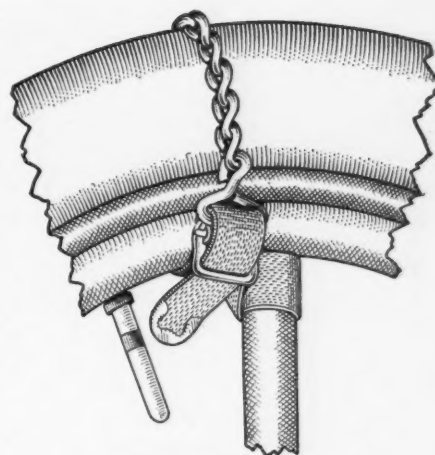
This ring, of the one-piece concentric type, is made by the Chalsmith Co., 6202 Eberhardt Avenue, Chicago, Ill. For sizes up to and including 3½ in. the price is \$1; up to and including 4½ in., \$1.25; up to



Gill Piston Ring

This concentric, one-piece piston ring has a double-step lap joint; shown clearly above

and including 5½ in., \$1.50; with special prices on larger sizes. These rings are made from a special gray iron casting. The double step-lap joint shown is claimed to give a perfect seal no matter to what degree expansion or contraction occurs.



Single Mud Chains

These chains are sold in sets of six, the maker, the Herman Manufacturing Company, 1420 Pennsylvania Avenue, N. W., Washington, D. C., claiming three on each rear wheel to be as effective as the usual style chains, except on asphalt. These are said to be lighter and cheaper than the usual chains. Prices are, per set: 3½ in. tire, \$2.20; for 4½ in., \$2.50; for 5½ in., \$4.

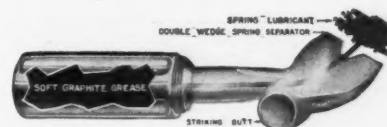
THE HART-BELL CARBON REMOVER

The Utility Products Co., 1411 Times Building, New York City, is manufacturing a device which makes carbon removing a simple operation.

The device is designed to convey water from the outlet water pipe of the cooling system to the intake manifold. This water is drawn into the cylinders, where it is transformed into super-heated steam. The live steam having the same action as an oil solvent loosens the carbon, which is forced out in the form of a heavy black smoke, through the exhaust.

The Hart-Bell Carbon Remover

The device is fitted with a three-way valve, so that it can be opened to the water, air or shut off. The makers state that it only takes fifteen minutes to remove the carbon.



Tomahawk Spring Lubricator

This illustration shows the quick and handy leaf spring lubricator put on the market by Chas. W. Manzel Company, 309 Beard Avenue, Buffalo, N. Y. This device is made of drop-forged steel, hardened and nickel plated. The price is \$.75 each. This Tomahawk Spring Lubricator is used first to separate the spring leaves, and then by a turn of the hand to shoot out grease.

International Motor Co., New York City, has secured an order for 700 5-ton Saurer trucks for Russia.

How Montgomery, Ward & Company Handle 150,000 Packages a Day

By CHARLES P. ROOT

The quick handling of packages and mail has been solved by Montgomery Ward & Co., the big Chicago mail-order house, located at Chicago Avenue and the Chicago River. Since the advent of the parcels post with its attending moderate carrying charges, the business of all mail-order houses has grown almost beyond comprehension and to handle the regular business, to say nothing of the increased trade, meant a study of labor-saving devices.

While the hauling of parcels post and other mail is not through means of motor

Handling 150,000 Packages a Day

The number of pieces of mail of all sorts—and fully half come under parcels post—foot up to about 150,000 a day, which would task even some of the biggest post-offices in the country. Before the new system was introduced the packages and letters and other mail were collected in house trucks, shoved by human power from floor to floor, up and down elevators and then to the loading platforms and put in wagons to be hauled to the various depots.

are backed up under the chutes on the Larrabee Street side of the enormous building.

One immense room is devoted to the post office department; in fact, it is a branch of the Chicago post office and every man there is in the employ of the government. It is arranged much on the plan of a modern post office, with racks for holding bags, chutes, etc., and it is also arranged with a view of giving every convenience possible. One part is for goods going out to a certain section of the country, another to some other section, all laid out in the most convenient form and to avoid mistakes and interference of any sort.

The packages and lighter mail are stamped at desks which are immediately adjoining a huge system of conveyors consisting of flat endless belts moved by electric motors and kept going at all times. A package is weighed, stamped, thrown on the conveyor and in a few seconds finds its way automatically to the post-office room on the second floor. Here the government employees take the packages in hand and assort them by railroads, placing them in huge floor trucks ready to be dumped into the chutes to be carted to the depot.

A truck is moved close to the chute, which has a big opening through the east wall, and the packages are dropped into the chute. There are a couple of turns before the truck is reached, and a total fall of about 20 ft. When the packages reach the car they are piled up neatly to give ample load and then the motor vehicle is rushed to the railroad yard to pass its load to the mail car.



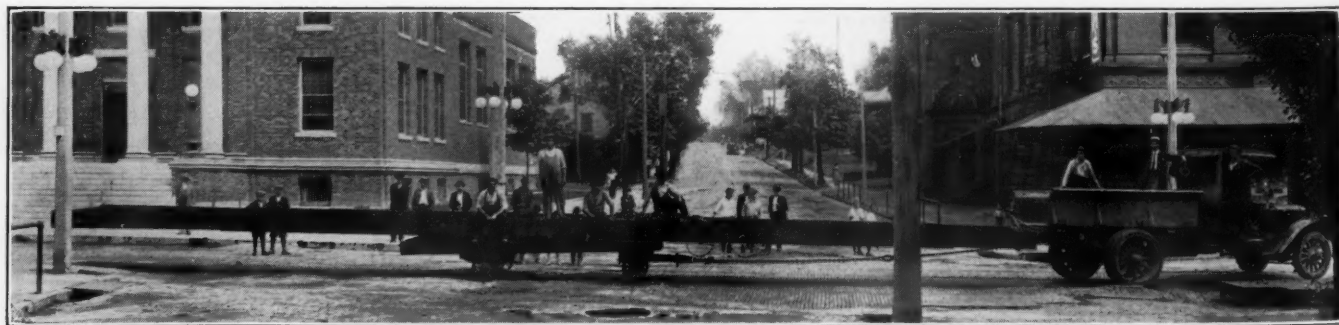
Loading Mail Trucks by Means of Exterior Chutes

This three-ton White truck is used by Montgomery, Ward & Company, of Chicago, for hauling registered mail. The illustration shows the quick loading methods employed, the bags being delivered from the second story directly to the truck body by gravity.

trucks essentially, the scheme adopted by this house might well be applied in other directions and therefore have a direct interest to all who use trucks, for unquestionably it is a huge saver of labor and a cost reducer at the same time.

All this has been changed by the introduction of mail chutes, five of them, which take all the mail matter of whatever nature from the second floor—which is in reality the shipping room—and convey it directly into the wagons or trucks, which

The City Council of Baltimore, Md., has recently passed a law requiring each motor truck to carry a special license besides the State license. This tag shows that the tires of the truck, on which the tag is placed, have been inspected by the city officials and that those tires on that certain truck will not injure Baltimore's newly paved streets.



Hauling a Sixty-One Foot Girder

This photograph shows an Atterbury five-ton truck hauling a girder 61 ft. long, 6 ft. 6 in. wide at one end, 5 ft. 4 in. wide at the other end. Weight of girder, 10 tons. Weight of trailer, 2 tons. Total weight, 12 tons. One-third of this weight is bearing on the truck and balance on the trailer. The heavier end of the girder being attached to the truck. This load, weighing twelve tons, was hauled a distance of $1\frac{1}{4}$ miles, one mile of this being up a four per cent grade. This work was done under the direction of Mr. Geo. E. Davis, truck driver for the Iron City Lumber Company, Salem, Ohio.

The CCJ has most advertisers because it gives them biggest returns



Latest British Three-Ton Military Model—The Laycock

By OUR FOREIGN CORRESPONDENT

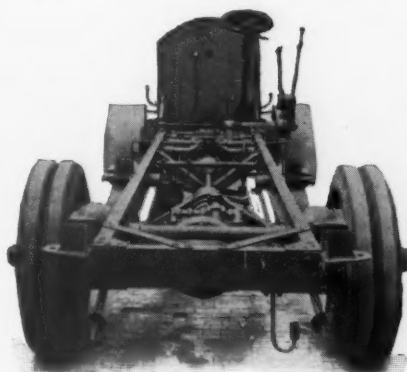
WHEN a large and influential firm holding British Government contracts embarks on commercial car movement in time of war the embodiment of their ideas is likely to be particularly instructive. Such a firm is S. W. Laycock, Ltd., who for many years have been world-famous for their fittings for trams, railroads and steamships, and their three-ton chassis certainly fulfills expectations of interesting possibilities.

The Broader Aim in Designing

A constant study of commercial car design during the last ten years or more rather leads to the conclusion that some designers regard their problem merely as one of producing a vehicle capable of running effectively with a load along the road. The designer of the new Laycock chassis has taken a longer and broader view, and regarded the commercial car not merely as a machine to be run along the road, but one to be run at best value for money—one to be kept on the road at a minimum of cost in time and money. Reduction of wear and repair facilities have throughout been kept very prominently in view.

Of course, in producing such a machine at the present time military requirements necessarily bulk large, and the machine has

been built to fully comply with the subsidy specification of the British Army. Under this specification it is a three tonner, which means that it is expected to carry 3 tons wherever military transport can go, and is therefore quite capable of



Rear-End View of Laycock Chassis
Showing heavy frame, spring slides and sprag bars

3½- to 4-ton loads on average roads in civilian employment.

General Features

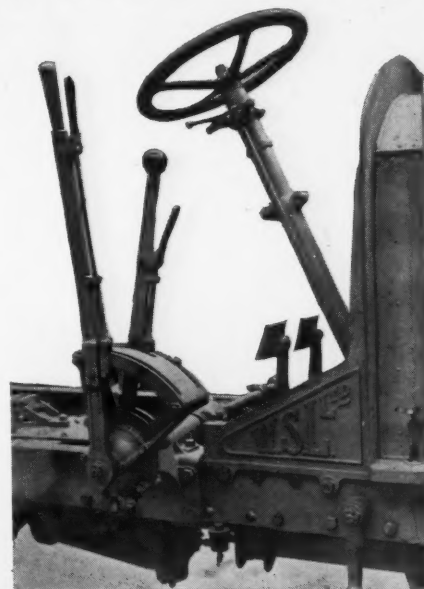
To briefly sum up its more general features: It is a 40 h.p., four-cylinder truck with leather cone clutch transmitting

to a gear box, affording speeds of 14.6, 8.4, 4.9 and 2.8 m.p.h. at normal engine speed of 1000 r.p.m., and from the gear box an universally jointed shaft drives through bevel gear a double reduction floating live axle, the reduction of which gives a ratio of 1 to 8.4.

Some of the Special Details

Turning now to details, the only unusual point about the engine is in the methods of holding the muffler, which is slung from the links to allow free expansion of the exhaust pipe.

Great care has been taken to ensure easy dismantling of the clutch. The clutch shaft is connected to the gear box primary shaft by an intermediate shaft coupled at



Laycock Control

The gate casing and the brake quadrant is a neat piece of design, enabling the gear box to be lowered free from the selector lever when required.

each end by flexible joints similar to the spider and leather disc joints first introduced on the English Daimler truck; only instead of leather a new material—a rubber saturated canvas fabric—is used for the disc, or to be more correct the ring connecting the three-armed spiders on the shafts. It is only necessary to disconnect these couplings and drop the intermediate shaft to adjust or draw the clutch. The latter operation can be effected simply by undoing a flange joint and a nut and lock nut on the shaft.



Front Quarter View of the British Laycock

This view illustrates the towing hooks, the radiator protection bar and the trunnion radiator supports, which are features required by the British War Office; also the diagonal radius-torque rods

The CCJ leads in circulation, advertising and prestige

Gear Box Removability

The gear box is arranged so that it can easily be lifted from the chassis. It is therefore supported on two tubular cross members carried at each end in brackets bolted to the frame. Each bracket is formed with a lip resting on top of the frame and is held to the frame side by three bolts. Therefore if each bracket is unbolted and slid inwards enough for the lip to clear the side frame the box can be lowered after the propeller, clutch shaft, brake and selector connections have been disconnected. As the gate with selector rocker is secured to the chassis frame (with the brake rocker passing through the latter, which is hollow) the selector arm on the rocker-shaft is neatly encased in a small upstanding extension on the gear box. The top of this casing is made separately, like the upper half of a split bearing. To free the selector rocker therefore, it is only necessary to undo the four bolts that hold this little capping piece, and the leather cover which protects from dust the length of the rocker shaft between this casing and the extension sleeve of the gate in which the rocker-shaft rotates. This will also give an idea of careful thought given to protection from dust.

One-Man Axle Demountability

In the axle design the same dismantling facilities have been observed. It is of the double reduction type, the bevel pinion of the propeller-shaft driving a very moderate sized bevel on a short cross-shaft that carries a spur pinion in mesh with a large spur wheel on the differential casing



Front View of Laycock Chassis

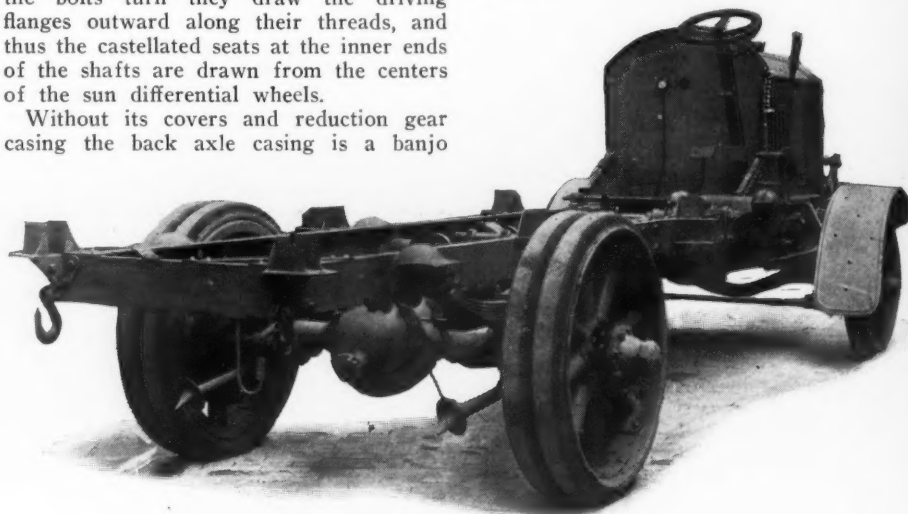
In this illustration, the fins at the bottom of the engine-base chamber are very clearly seen

of the axle; and the casing of this double reduction gear is so arranged that it can be removed in two sections, and can therefore be dismantled by one man.

Since the axle itself is of the floating type, the axle shafts driving the wheels can be withdrawn, and differential lifted out either through the cover at the back of the axle casing, or through the front after the reduction gear has been removed. At their outer ends the axle shafts are formed as flanges or driving plates bolted to the wheel hubs, but when these are unbolted for withdrawal the inner ends, which form the seatings of the sun differential wheels, must be capable of sliding outwards. But they must not be too easy a fit in the differential wheels, and consequently, when being drawn, may have to

be persuaded. Accordingly holes are drilled and tapped in the driving flanges of the axle shafts so that bolts may be run through them until their ends bear against the wheel center. Then the principle of the screw comes into play, and as the bolts turn they draw the driving flanges outward along their threads, and thus the castellated seats at the inner ends of the shafts are drawn from the centers of the sun differential wheels.

Without its covers and reduction gear casing the back axle casing is a banjo



Rear Quarter View of the Laycock

This gives a good idea of the back axle, the towing hooks, and the strong sprags required for British Army Service; also the construction of sliding spring shoes.

shaped nickel-chrome steel forging, held so that it is free to turn in spring pads, for the springs take no torque or back axle thrust; these stresses are taken by torque rods running from each side of the back axle diagonally forwards so as to meet in a large ball and socket joint on the cross frame member behind the gear box, which is accordingly dropped so as to pass underneath the propeller shaft. Thus if the front universal joint came adrift the propeller shaft would be supported by this V-shaped member instead of digging into the ground.

Cheap Renewals

The wheels are very neatly built up of steel on the latest Clarkson-Morris pattern.

In the attachment of the springs to the frame we see evidenced the careful thought given to low repairing cost. As far as possible shackles have been avoided. The back springs are fitted with shoes that slide in the guide brackets which support the frame on the springs, and as these brackets are relatively expensive steel castings, the wear is taken by phosphor-bronze liners that can be easily and cheaply renewed. The pins too that secure the spring ends to the sliding shoes are hardened and ground to very fine limits, and fitted in a phosphor-bronze bush for the same reason, as also are the shackle plates and eyes on the back ends of the front springs.

To increase the range of adjustment on the back wheel brakes the fittings of the operating levers on the rocking shafts are finely castellated or serrated, and held on the seatings by nut and split pin.

The modern tendency of fitting a complete steering worm wheel instead of only a sector is adopted, and since on the shaft of this worm wheel the seating for the lever connecting it with the drag link is castellated, it is only necessary to remove the split pin and nut on the end of the

shaft to remove the lever and enable the steering wheel to be freely rotated and the worm to bring fresh worm wheel surfaces into action, when undue wear has occurred at any point on the worm wheel circumference.

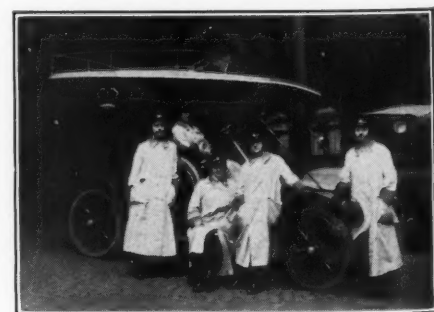
A Note on Frame Strutting

There are two points to which to call attention in the frame. The first is that ordinary channel steel is used in preference to pressings, on the grounds that the frame can thus be supplied to any required length.

The second point is that cross members are carefully placed opposite the spring hanger brackets (though in the end view the cross member opposite the front brackets of the rear spring has been removed to show the transmission details). Thus a frame structure much better calculated to stand lateral stresses is produced.

A Point in Bonnet Design

In the general view it will be seen that louvres are formed only in the hinder part of the bonnet, for as a result of experiments Messrs. Laycock found that louvres towards the front actually took away from the efficiency of the radiator.



Ladies for the Mails

Owing to the shortage of men, so many of whom have been called to serve in the war, some enterprising firms are employing women for driving cars and vans. Here are some ladies engaged in driving the motor mail vans with which J. Blake & Company, of Dale Street, Liverpool, carry on road services as contractors to the British Post Office.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Utilization of By-Products Reduces Cost of Operation of Electrics in Laundry

Costs \$71 Per Month to Operate Eighteen Machines, Showing a Saving of Over \$600 a Month—Machines Are a Great Advertisement for Laundry Business

By A. JACKSON MARSHALL, Secretary of the E. V. A.

ONE of the industries that has been under investigation by the Electric Vehicle Association for some time is the laundry business. Electric vehicle interests are extremely fortunate in having such a successful operator of electrics in the laundry service as Mr. Henry Sieminski, proprietor of the Brunswick Laundry of Jersey City. Mr. Sieminski is generally recognized in the laundry trade as being unusually successful largely because he has continuously employed most advanced methods. His experience with a fleet of eighteen electric delivery wagons over a period of three years justifies careful consideration. The following is an interview with Mr. Sieminski:

"The experience of the Brunswick Laundry with electric delivery wagons has been very successful. After three years' experience, during which time we have added to our fleet gradually so that we now operate eighteen electrics, with two more on order, I feel that I have had ample opportunity to observe the results of electric delivery service and compare them with other methods of delivery. We bought our first electric three years ago, and it gave such excellent results, that when the time came to enlarge our equipment, I decided to dispose of our horses and wagons and buy electrics. To have continued with horse-drawn vehicles would have meant an investment of \$18,000 in new stables alone, exclusive of new wagons and more horses. The man who uses horses for delivery always has a score of bills coming in for harness, feed, horseshoeing, veterinary service, blankets, wagon repairs, etc.

Eighteen Electrics Do Work of Forty Horses

"The eighteen electrics have not only done the work of forty horses which I formerly owned, but also take care of unusually heavy increase in business. I employed three stablemen to take care of my horses as against one mechanic now who not only attend to the mechanical parts of the cars, but looks over the motors in the laundry. The sure road to success in a business of this kind is conservation of energy and utilization of by-products. I consider that the current with which we charge our electrics is a by-product. As in most large laundries where everything is run by electricity, we generate our own power. We have found that the amount of water we can heat during the day is not sufficient for our needs, so we found it necessary to heat water at night for the next day's washing. At the same time we charge our electric vehicles with the current generated for heating the tanks of water, so that I consider the electricity with which we charge our batteries a by-product. The distilled water which we use

for our nickel-iron batteries is another by-product—the condensed steam from the hot water used for washing. I have kept track of our coal bills for several months and I find that since we have been heating our water and charging our cars at night the bills have increased just \$71 per month. As I figure that the extra hot water offsets the wages of the night mechanic who cares for the electrics, I estimate that we operate our entire fleet of eighteen electrics for \$71 per month—the cost of the additional coal for generating current. This represents an expenditure of less than \$4 per month for the energy necessary to propel each 1000-lb. delivery wagon. On a 300-day a year basis this figures the very low cost of \$.16 per day per car for current.

electrics. The initial cost is of course comparatively large, yet when the extreme longevity of the cars is considered the cost per year is very low. In addition, I consider the advertising value of the electric in the laundry business worth considerably more than the interest would be on the initial cost. A clean, attractively painted, smooth-running, silent car is the best advertiser in the world for the laundry business.

"The batteries which we use in our electrics are the nickel-iron type, and although the manufacturer guarantees them for four years, I am counting on getting about eight years out of mine. Just to prove to myself the longevity of this type of battery, I bought at auction a \$1200 battery which



Fleet of Eighteen Electrics Used by Laundry

These are in use by the Brunswick Laundry, of Jersey City, N. J., and it is stated they are doing the work of forty horses

"As a matter of general interest to the laundryman, by careful managing and by utilizing every possible by-product we have done \$20,000 worth of business on an average coal bill of \$500. It will also be interesting to the man who must buy his own current, to know that I operated my electrics under this plan, at a general average of \$10 a month per car. As my electric delivery wagons averaged 20 miles per day during this period and figuring on 300 working days to the year, it will be noted that the cost for current per mile was about \$.02.

Saving of \$600 a Month

"As for repair bills, I find that they are a negligible quantity. I have paid just \$16 for repairs on our first electric, which we have used constantly for over three years, and that was for new chains and sprockets. Compare this slight expense with the bills for wagon and harness repair, horseshoeing, veterinary service, etc. We are saving something over \$600 a month by operating

had been used over 4 years for \$279. With a little cleaning and fresh solution, I have been using this same battery for 1½ years, and expect to get considerable more use from it. Tires, I find, will last from 1½ to 2 years. With the present excellent standardization of parts it is possible always to substitute new parts as soon as the old ones wear out. We keep several accessories on hand in case of accident, and an extra motor, so that cars are never laid up for any length of time. So far I have had scarcely any occasion to use these parts.

"To show how dependable our service is, our customers can always count on deliveries at a certain time each week within 15 minutes of the hour. This is appreciated by the customers, because they not only know when to expect fresh laundry, but furthermore do not have to waste time or be otherwise inconvenienced by waiting. Women appreciate the neatness of our delivery men and wagons. This is another important feature in laundry work. Our

cars make on an average of 25 miles per day, visiting all the outlying suburban districts. Some of our best drivers deliver as many as 900 bundles per week and make an average of 32 miles per day. At an average of 25 miles per day and a current cost of \$4 per month the current cost per mile is about \$.006. Also on this basis and figuring 900 bundles delivered per week the energy cost of each bundle delivered is about \$.0001. In other words, the current consumed in delivering 100 bundles costs about \$.01. This is reducing economy to well nigh the irreducible minimum."

THE RUGGEDNESS OF THE EDISON STORAGE BATTERY

THAT the user of the Edison alkaline storage battery—with its steel construction, steel plates, steel poles, steel jars—looks for a degree of ruggedness that is commensurate with the materials employed, is evident, but that this degree of ruggedness has transcended even the most sanguine expectations of its maker is proven by the incidents described in this article.

On many occasions Edison batteries have passed through fires that have completely burned the wooden trays in which they were assembled, and have even melted some of the hard rubber insulation. Many of these experiences have resulted in only a temporary decrease in efficiency instead of complete annihilation, and after making the few necessary repairs the battery has been returned to work better than new. One instance of this was a fire in Indianapolis, a year or two ago, that burned a garage to the ground. The next morning an Edison-equipped electric was run from the ruins on power supplied from its Edison batteries, even though the body of the

car was burned and the wooden trays in which the cells were assembled were badly charred.

Another trial by fire occurred in 1913 when the garage of the Electric Light Co. of Cambridge, Mass., was burned and its contents practically destroyed. The remains of one Edison equipped truck is shown in the illustration. With exception of two cells in this Edison battery none were beyond repair—in fact, practically nothing had to be done except insert new rubber parts when the cells were recanned.

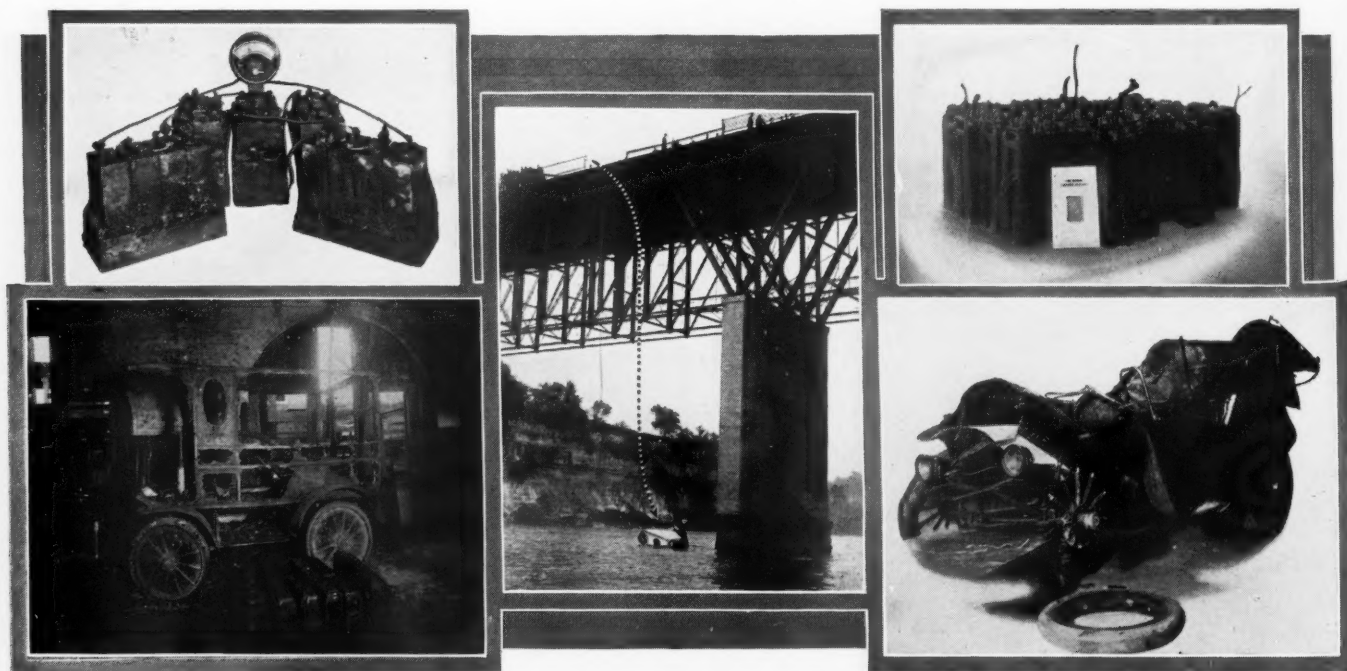
Numerous instances are on record where the Edison batteries have demonstrated capacity to withstand severe vibration and concussion. They have passed through collisions with little more than a few dents in the steel containers and broken trays. An Edison-equipped delivery wagon owned by Bonwit, Teller & Co., New York City, was jammed between a street car and the Boulevard fence at 111th Street. The wagon was smashed and the fence was bent, but the only damage done to the Edison battery was to split the bottom slat of one wooden tray.

Its latest demonstration of ruggedness occurred recently at Minneapolis. One of the thirty-six electric delivery wagons built and owned by the Purity Baking Co. of St. Paul, and equipped with Edison alkaline storage batteries, left the roadway of a bridge, mounted the sidewalk, crashed through the iron side railing and plunged 100 ft. into the Mississippi. After it had been submerged for about twelve hours, the Edison battery was removed. Some of the steel containers were considerably bent and dented and the wooden trays showed the effect of the fall, but before any repairs whatsoever were made the Edison battery was put on "bench test" and every cell was well above rated capacity (225 ampere hours) on a normal charge. The maximum

capacity to one volt was 277 ampere hours and the minimum capacity (with the exception of one cell) was 247 ampere hours.

The experience of the Edison battery in the Omaha cyclone is another interesting incident. An Edison-equipped Detroit roadster was buried under tons of brick. The metal hood of the car was crushed down on the battery, making a short circuit that burned off the "jumpers." When the report of this catastrophe was made it was found that there was not one damaged cell in the lot.

Fire totally destroyed the shipyard of the New York Yacht and Engine Co. so that there was not a semblance of a boat or building left. Before the fire, there was a handsome 65-ft. power boat in the shipyard about ready for launching, and it was equipped with twenty-eight cells of Edison battery. The battery was in a mahogany box, and owing to its non-corrosive characteristics, was located on the deck. After the fire, the first objects to catch the eye as one approached the middle of the ruins were the twenty-eight Edison cells standing up on top of a heap of ashes, twisted iron and debris. The heat in the immediate neighborhood had been so great that it had melted the brass manifolds on two engines. The slate switchboard and instruments which had been installed about three feet from the battery were totally destroyed. The slate was reduced to small pieces of flake and only the fronts of the instruments remained. All of the bushings and hard rubber insulators of the Edison battery were totally destroyed. However, the connectors had not become loose and there was sufficient charred insulation in place to permit a test. Twenty of these cells when so tested showed an average of 1.3 volts and the current available in the battery was sufficient to turn a No. 14 wire red hot in a few seconds.



Edison Batteries that Survived Fire and Water Catastrophes

Upper left: Cells taken from ruins of the New York Yacht and Engine Company's fire, showed 26 volts left in battery. Lower left: All but two cells survived this fire in the garage of the Cambridge Electric Light Company. Upper right: Cells recovered from the ruins of the Detroit Roadster shown in the illustration beneath. Not a cell was damaged in the lot, although the hood was crushed down on the battery, making a short-circuit and burning off the jumpers. The center illustration shows the delivery wagon of the Purity Baking Company, after it plunged into the Mississippi river. A twelve hour soaking failed to harm the batteries, the only damage done being the denting of some of the containers.

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Industrial Trucks in the Service of the Pennsylvania Railroad*



THE industrial truck as at present developed comprises several general classes, as governed by condition of service. These are:

Baggage and mail trucks for use in passenger stations.

Warehouse trucks for freight stations and warehouses.

Shop trucks for railroad shops and general industrial purposes.

Electric tractors for propelling freight cars over street railway track.

There are no well defined lines of demarcation between the first three classes and several modifications of each class have been constructed, as demanded by the condition at each installation.

Baggage Truck.—The baggage trucks are characterized by a height of about two-thirds the distance from the platform to the baggage car floor. This works out at about 30 in. The length is controlled generally by existing elevator sizes and ranges from 9 to 12 ft. The width is slightly greater than the length of large trucks, generally 44 in.

A modification of the baggage truck has a body only 9 in. high for use in depressed track stations where the car floor is but slightly higher than the station platform.

Warehouse Trucks.—The electric warehouse trucks are characterized by a depressed portion at one end to facilitate loading, and delivery of the load into the end of the car.

The restrictions limit the height to about 10 in., the width to about 40 in. and the overall length to less than 9 ft.

Shop Trucks.—The use of shop trucks is subject to a variety of conditions as regards relative size and bulk of material handled. This has required a number of modifications in truck sizes.

A distinct shop truck class has therefore not been developed but adaption made of baggage and warehouse classes.

Double End Control.—Railroad stations and shops are generally congested, runways as narrow as conditions will allow, therefore with the object of avoiding entirely the necessity of turning around, thereby blocking other traffic, railroad industrial trucks have been constructed with double end control. This feature permits of operation with equal facility in either direction, reducing congestion to a minimum.

An exception is the warehouse truck which must have the low frame available for operation into freight cars.

Four-Wheel Steer.—Space required to turn is still further reduced by steering four wheels instead of two, and operation is made exactly in either direction. This eliminates the dangerous practice of running two-wheel steering trucks backward.

Two-Wheel Drive.—Sufficient traction for all ordinary work is available with two-wheel driving and therefore four-wheel driving complication is avoided.

Voltage.—The voltage of industrial trucks has been selected after a careful study of the advantages of prevailing commercial truck standards and of much lower voltages, and was finally adopted at 24 volts as the minimum at which efficient motors were obtainable, in consideration of the preponderant advantage of the low voltage battery.

*Extract of paper presented by T. V. Buckwalter at the Sixth Annual Convention of the Electric Vehicle Association, Cleveland, October 18-19, 1915.

The 24-volt battery has the following advantages:

Minimum number of cells,
Minimum number of connectors,

Consequently,

Minimum possibility of jar and connector breakage,

Minimum cost per unit of capacity,
Minimum weight per unit of capacity.

Capacity.—The Capacity of industrial trucks was worked out at 4000 lbs. as the maximum that could be readily and safely handled within narrow and congested enclosures, in consideration of the absolute necessity of quick stopping and positive and quick manipulation of control mechanism.

Larger than 4000-lb. trucks are too cumbersome and smaller trucks do not handle enough to realize the full efficiency of the service.

A 50 per cent. overload factor has been found desirable which makes a total weight as much as can be quickly handled.

Speeds.—High speed capacity has been found of little or no value for the reason that the speed is entirely a matter of condition and amount of congestion of runways, presence of other people who have other duties beside looking out for trucks. Therefore the speed has been gradually reduced as our experience increased to the present standard of 6 to 7 m.p.h. with the empty truck and 5 to 6 m.p.h. loaded.

General.—The foregoing is intended as a general description of trucks designed to meet railroad conditions of service as these conditions appear to railroad men. If certain characteristics are considered essential in an industrial truck, every effort has been made to obtain such desirable characteristics, sometimes at an increased cost over simpler but less efficient structures.

Operating Results.—It is understood this association is interested chiefly in operating results. The appended table entitled Summary of Operating Data, year 1914, should be found particularly interesting.

This table shows all labor and operating charges for the year 1914 for a total of 212 trucks.

The table is arranged in two sections devoted to total charges for all trucks at each installation and averages per truck month for each installation.

There is naturally a wide variation in some of the charges, due to difference in current cost ranging from 5 mills to \$.10 per k.w.h. to the number of trucks in the installation, and the character of the work.

The shop trucks include labor charges of drivers, but the baggage trucks do not include these charges for the reason that the trucks are driven by the baggage porters.

The installations are given an efficiency standing based on saving on shop trucks and on cost of operation on baggage trucks. The former is computed on saving because these trucks handle work formerly done by manual labor and the saving is readily computed. However, the figures do not represent the total saving, as for instance increased efficiency of the shop due to having material handled on a regular and prompt schedule does not admit of calculation.

The old practice of helping out the labor gang with machinists is largely avoided.

The saving effected in baggage service is considerable and some figures are available but were not considered sufficiently complete to be presented at this time. This saving is difficult of calculation. The character of the service has changed considerably since the introduction of electric trucks. The Parcel Post, formerly non-existent, is now a large and important part of the work. The labor force has not, generally speaking, been decreased, but on the other hand, the business has increased.

Rush periods can now be handled without borrowing untrained men from other departments. A better class of men continue in service, as compared with the rapidly changing force in the old days.

The operating people consider that the most important advantage of electric baggage trucks is relief to terminal congestion and prompt despatch of trains resulting from avoidance of baggage detention.

The saving effected is not stated on certain installations. This does not indicate

Electric Trucks—Summary of Operating Data, Year 1914

Shop Trucks.

Shop	No. of trucks	Average monthly data all trucks							Averages per truck month			
		Labor			Material			Total cost	Total cost	Current cost	Savings	Percentage (See note 2)
		Driver	Truck repairs	Battery repairs and charging	Truck	Battery	Tire					
Harrisburg	1	48.96	2.62	1.76	1.89	4.40	5.39	209	5.43	70.47	5.43	100.0
Verona	1	59.96	5.30	2.74	1.55	1.99	1.48	597	8.81	82.94	8.81	154.65
Trenton	1	32.48	5.74	2.84	8.36	1.56	0.35	792	9.90	67.30	9.90	134.9
Junata	2	76.64	13.23	11.82	5.36	11.42	1.73	1,426	11.14	131.33	65.66	109.15
Altoona car shops	3	116.96	12.52	18.26	21.96	12.54	—	1,851	8.57	190.81	61.60	96.12
Renovo	2	92.96	2.84	12.35	1.61	8.28	—	1,168	18.05	196.10	68.05	93.61
Mt. Carbon	1	32.36	0.39	2.39	0.40	1.13	—	272	8.80	45.47	8.80	93.22
Altoona machine shops	9	560.42	88.96	35.89	45.79	13.72	29.77	2,349	14.06	788.61	57.62	116.22
Pittsford	4-5	108.46	44.48	30.74	22.07	22.64	20.81	789	4.05	312.75	67.99	89.54
South Pittsburgh	1	47.35	1.81	1.70	0.22	0.51	—	399	4.60	51.27	51.27	64.04
Meadows shop	1	—	2.55	1.06	0.74	0.08	—	734	29.40	34.13	34.13	29.40
Sunnyside yard	10-14	—	40.89	14.32	22.29	3.21	12.80	4,038	38.86	134.37	12.73	3.74
West Philadelphia	1	10.37	1.68	0.68	0.01	0.06	—	208	1.88	13.54	13.54	1.44
Jersey City Pier L	3-5	—	30.10	30.93	22.18	15.05	9.38	1,340	45.77	173.42	51.00	13.46

Baggage Trucks.

Station	No. of trucks	Average monthly data all trucks							Averages per truck month			
		Labor			Material			Total cost	Total cost	Current cost	Savings	Percentage (See note 3)
		Truck repairs	Battery repairs and charging	Truck	Battery	Tire	Kilo-watt hours					
Baltimore	2	6.54	6.02	1.30	0.62	1.53	953	11.50	27.50	13.75	5.75	100.0
Philadelphia	34-35	87.55	96.36	128.52	12.30	8.19	6,821	88.66	431.58	16.93	3.56	81.2
Pittsburgh	17-28	154.50	136.98	128.50	40.07	1.43	6,731	34.96	503.13	17.97	1.25	76.5
New York	64-66	198.11	174.91	245.71	475.38	21.04	5,016	66.63	1,184.48	18.68	1.02	76.1
North Philadelphia	4-10	23.29	33.28	15.09	37.76	6.11	1,534	43.56	154.09	24.85	7.03	55.3
Washington	18	90.46	58.17	67.59	37.91	114.72	11,810	85.88	455.00	25.28	4.77	54.4
Jersey City	3-5	40.88	17.66	16.34	21.48	—	506	19.12	115.38	29.58	4.90	46.5
Harrisburg	1	10.44	4.17	0.96	39.04	—	598	12.01	66.00	66.00	12.01	20.6

1. The efficiency standing of each truck installation is indicated on a percentage basis. 2. Shop truck efficiency is based on saving in labor effected. 3. Baggage truck efficiency is based on cost of maintenance per truck month. 4. In each case the best showing is indicated as 100% efficiency.

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absence of saving but failure of operating people to ascertain same in time for this paper. The installations omitted would be near the top of the list.

Under the heading "Number of Trucks" is indicated the number at the beginning and the end of the year, but averages are based on actual truck months.

Electric Tractor

The electric tractor has now been in service thirty-one months and has proved entirely satisfactory. A description of this machine will be found in the S.A.E. Proceedings, year 1914, page 231. A brief description, however, may be of interest.

The machine is intended to replace horses in the operation of freight cars on track laid on paved streets. The tractor runs on the pavement and the fundamental reason for the success following its operation is the ability to be operated without confinement to rails.

Cars can be handled from either end by either end of the tractor.

Steering, driving and braking is on four wheels.

The tire size is 60x6 in. dual. Weight 29,000 lbs.

Draw bar capacity 8000 lbs. at 2 m.p.h.

Normal speed 6 m.p.h. with one car on level tangent.

Brakes can be operated by hand or automatic air.

Radial draft gear with standard couplers is provided at each end.

The diameter of the steering wheel is 42 in. with other parts in proportion.

The brake shoes are four in number, 2½ in. wide by 30 in. diameter.

Driving gears are 33 in. diameter and 4 in. wide on each wheel.

The results of operation are shown on the attached table.

The growth of service in number of cars handled per month indicates gradual growth of from 690 to 920 cars per month during a period when railroad business has

Average Daily Performance of Electric Tractor by Months

1913	Hours on charge	Hours in service	Discharge in ampere hours	Miles	Number of cars handled			Internal move-ments	Total weight tons	Days in service	Days out service
					In	Out	Total				
February	8.2	8.5	616	12.1	14.8	14.8	29.6	19.5	992		
March	7.3	8.5	508	12.6	15.3	15.0	30.0	19.4	1,032		
April	7.9	9.5	518	13.7	15.7	16.5	32.3	20.9	1,100		
May	7.3	8.5	510	14.8	17.0	17.0	34.1	17.3	1,118		
June	6.7	8.6	494	13.1	15.7	15.9	31.6	14.0	1,057		
July	6.0	7.7	410	14.4	14.4	14.4	28.7	13.6	962		
August	5.5	6.7	344	10.3	11.4	11.4	22.8	14.3	763		
September	7.0	6.1	432	11.3	13.9	13.9	27.8	16.2	931		
October	7.0	7.8	511	12.4	15.7	15.3	31.1	23.8	1,070		
November	6.2	6.6	433	11.2	12.8	13.0	25.8	20.0	855		
December	6.0	6.7	415	9.7	10.9	11.6	22.4	20.0	752		
Average	6.8	7.7	472	12.3	14.3	14.4	28.7	18.1	967		
TOTALS BY MONTHS.											
February	164	168	12,120	241.5	297	296	593	390	19,842	20	
March	190	220	13,230	328.3	398	390	788	504	26,837	26	
April	166	199	10,890	280.9	330	346	676	438	23,082	21	5
May	160	186	11,225	325.0	375	375	750	380	24,600	22	4
June	167	215	12,330	327.9	393	397	790	351	26,433	25	
July	156	199	10,430	303.7	374	373	747	354	25,005	26	
August	144	174	8,940	268.7	296	295	591	371	19,775	26	
September	175	152	10,790	294.4	347	349	696	421	23,288	26	
October	190	210	13,820	334.0	424	414	838	643	28,877	27	
November	142	152	9,970	257.7	293	298	591	458	19,775	23	
December	175	175	10,790	251.2	285	299	584	519	19,540	26	
Total	1,809	2,050	124,535	3213.3	3,812	3,832	7,644	4,829	257,054	268	9
1914											
January	7.5	7.2	605	11.7	14.1	13.1	27.1	22.1	905		
February	8.9	8.9	806	14.9	16.8	16.5	33.3	19.1	1,115		
March	7.9	8.0	616	12.5	15.9	16.0	31.8	21.6	1,065		
April	6.0	6.5	449	10.5	13.5	13.8	27.3	19.8	912		
May	6.2	7.0	375	10.6	14.0	14.0	27.8	20.8	925		
June	6.5	7.9	452	12.3	17.7	17.5	35.2	21.7	1,172		
July	5.8	7.5	415	11.8	15.3	15.5	30.8	21.4	1,031		
August	5.2	6.5	356	10.3	13.5	13.3	26.9	19.2	902		
September	5.8	7.5	384	12.0	16.6	17.1	33.7	22.3	1,130		
October	6.2	7.9	357	11.0	14.4	14.4	28.8	18.5	965		
November	6.9	8.2	425	10.2	12.8	12.2	25.0	20.2	839		
December	7.0	8.0	492	9.9	12.1	12.8	24.9	19.2	835		
Average	6.7	7.6	478	11.5	14.7	14.7	29.4	20.5	983		
TOTAL BY MONTHS.											
January	120	114	9,680	187.4	223	210	433	354	14,448	16	11*
February	195	196	17,730	327.5	370	362	732	420	24,493	22	1†
March	197	201	15,410	313.1	397	399	796	516	26,634	26	1†
April	161	178	11,660	268.5	351	358	709	516	23,723	26	
May	154	174	9,370	264.4	348	346	694	522	23,121	27	
June	170	204	11,740	319.3	460	454	914	566	35,582	26	
July	162	195	10,800	308.7	398	403	801	557	26,801	26	
August	136	170	9,270	268.3	353	348	701	499	23,455	26	
September	135	173	8,830	277.0	383	394	777	514	25,998	23	2**
October	168	213	9,650	298.4	390	389	779	501	26,065	27	
November	160	189	9,880	236.2	295	282	577	466	19,306	23	
December	183	209	12,800	258.7	316	333	649	501	21,716	26	
Total	1,931	2,216	136,820	3328.0	4,284	4,278	8,562	5,956	291,382	293	
1915											
January	9.2	8.9	604	12.4	17.3	16.9	34.2	20.7	1,147		
February	9.5	8.3	660	13.6	18.1	17.9	36.1	25.5	1,208		
March	9.0	8.4	594	13.1	18.3	18.5	37.0	28.7	1,240		
April	8.3	8.3	512	13.7	20.0	20.0	40.0	30.8	1,345		
May	6.9	7.5	425	11.8	17.3	17.7	35.0	24.4	1,169		
June	7.1	8.4	468	13.4	19.3	19.2	38.5	24.5	1,286		
July	6.6	7.9	419	11.9	16.9	16.4	33.4	20.1	1,116		
Average	8.1	8.2	526.1	12.8	18.2	18.1	36.3	25.0	1215.8		
TOTAL IN MONTHS.											
January	232	223	15,090	311.0	433	424	857	518	28,675	25	
February	211	183	14,530	290.1	400	394	794	562	26,567	22	
March	242	227	16,040	352.3	496	504	1,000	775	33,460	27	
April	216	217	13,320	354.3	521	519	1,040	798	34,798	26	
May	172	187	10,630	295.7	432	442	874	609	29,244	25	
June	183	219	12,160	349.7	501	498	999	633	33,426	26	
July	171	205	10,910	309.9	441	427	868	522	29,043	26	
Total	1,427	1,461	92,680	2263.0	3,224	3,208	6,432	4,417	215,203	177	

*Loaned. †No cars. **Painting.

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been stationary. At the same time the cost per car has decreased from a maximum of \$.83 to \$.58.

Other interesting data may also be mentioned:

Loss of time in 2½ years is 9 days due to failure of the machine.

Saving over investment 71 per cent, saving per day \$32.25.

In traveling 8804 miles the machine has handled cars aggregating 287 miles in length.

Cost of service per ton based on cars in and out is \$.024, but operating cost on all cars handled is only \$.0104 per ton.

Internal movements have reference to cars moved from point to point within the trackage operated by the tractor. These movements were not included in total costs of service.

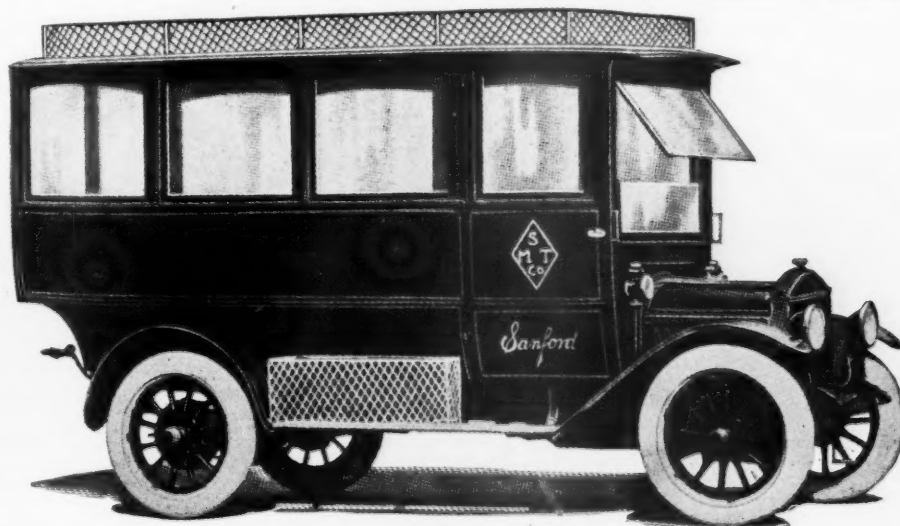
It is hoped this paper will encourage other users of electric trucks to submit actual operating data based on service of these machines.

Data Derived from Preceding Tables

Cost of tractor	\$13,400.00
Cost of maintenance and operation 2½ years	\$13,145.67
Interest at 6 per cent. on \$13,400 2½ years	2,010.00
Depreciation, less tires and battery \$13,400—\$4200=\$9200, @ 5 per cent. 2½ years	1,150.00
Depreciation battery \$3200 @ 25 per cent. 2½ years	2,000.00
	\$18,305.67
Total cost of service 2½ years	18,305.67
Total number of cars (in and out) 2½ years 22,639 cars	42,108.54
Total cost of service if horses had been used, \$22,639×\$1.86	23,802.87
Saving by electric tractor 2½ years	177.6 per cent.
Saving over investment 1 year	71.0 per cent.
Total cost of service per car 18,305.67÷22,639	\$0.805
Average weight per car	33.196 tons
Cost of service per ton (in and out)	\$0.0243
Total miles operated	8804.3 miles
Total number cars handled in internal movements	15,202 cars
Grand total cars (in, out and internal)	37,841
Cost of maintenance and operation per car (in, out and internal) 13,145.67÷37,841	\$0.347
Cost of maintenance and operation per ton (in, out and internal)	\$0.0104
Cost of maintenance and operation per mile 13,145.67÷8804.3	\$1.49
Total length all cars handled 37,841×40 ft.	287 miles
Cost of service per working day by tractor 18,305.67÷738 days	\$24.81
Cost of service per working day by teams 42,108.34÷738 days	\$57.06
Saving per day	\$32.25

Cost of Maintenance and Operation

1913	Repairs	Supplies	Cost of lub.	Driver	Current	Insurance	Labor	Total	Cars	Cost per car	Kw. hrs.	Cars from Jan., 1913	Cost per cars	Cost from Jan., 1913
January	\$11.82	\$3.71	\$1.80	\$64.06	\$5.14			\$85.81					\$85.81	
February ...	11.78	2.02	1.13	139.14	91.38			254.45	594	\$0.41		544	\$0.558	331.26
March	100.82	6.40	1.18	105.18	95.45			308.03	788	0.39		1,382	0.463	639.29
April	183.86	13.38	1.55	125.89	92.19			416.97	676	0.62		2,058	0.513	1056.26
May	538.39	3.67	1.58	141.52	122.05			817.20	750	1.09		2,808	0.667	1873.46
June	894.94	9.43	1.12	140.08	73.97			1120.34	790	1.42		3,598	0.832	2993.80
July	59.36	2.59	8.10	146.09	103.39			319.53	747	0.43		4,345	0.763	3313.33
August	16.71	5.01	2.82	161.85	96.40			282.79	591	0.48		5,632	0.728	3596.15
September ..	4.97	4.63	0.29	146.27	106.24			262.40	696	0.377	5,111	4,936	0.685	3858.52
October	32.17	0.84	31.39	155.82	118.81			339.03	838	0.405		4,696	0.648	4197.55
November ..	306.06	1.90	9.33	150.30	91.38			558.97	591	0.946	3,800	7,061	0.673	4756.52
December ..	638.03	104.92	3.28	145.00	82.94			974.17	584	1.67	3,770	7,645	0.749	5730.69
1914	Repairs	Supplies	Cost of lub.	Driver	Current	Insurance	Labor	Total	Cars	Cost per car	Kw. hrs.	Cars from Jan., 1913	Cost per cars	Cost from Jan., 1913
January	\$488.16	\$0.31		\$104.09	\$95.01			\$709.07	433	\$1.64	3,374	8,078	\$0.797	\$6439.76
February ...	11.25	2.92		132.90	129.85			276.90	732	0.32	5,514	8,810	0.762	6716.66
March	184.22	2.54	\$0.54	139.72	120.13			447.15	796	0.56	5,469	9,606	0.746	7163.81
April	19.19	153.23		135.01	95.91			268.24	709	0.378	4,134	10,315	0.721	7432.05
May	26.43	4.58	8.25	128.97	79.18			247.41	694	0.356	4,134	11,009	0.697	7679.46
June	83.98	8.78		137.13	81.29			311.18	914	0.34	3,899	11,923	0.67	7990.64
July	145.26	4.66		140.37	85.98			376.37	801	0.469	3,605	12,724	0.657	8367.01
August	19.83	1.34	2.02	144.42	78.63			246.24	701	0.351	3,403	13,425	0.641	8613.25
September ..	733.63	2.54	0.84	137.45	73.27			947.73	777	1.22	3,177	14,202	0.671	9560.98
October	365.96	6.02	1.95	90.86	53.81		\$38.97	587.57	779	0.754	3,667	14,981	0.677	10148.55
November ..	115.96	3.20	1.09	62.79	78.81		58.82	320.67	577	0.599	3,945	15,558	0.672	10469.22
December ..	133.79	1.45	8.25	73.54	101.81		55.81	374.65	649	0.677	3,945	16,207	0.669	10843.87
1915	Repairs	Supplies	Cost of lub.	Driver	Current	Insurance	Labor	Total	Cars	Cost per car	Kw. hrs.	Cars from Jan., 1913	Cost per cars	Cost from Jan., 1913
January	28.65	6.45	0.50	72.67	94.05		69.36	271.71	857	0.377	3,945	17,064	0.651	11115.58
February ...	75.44	1.54	0.84	61.72	86.93		64.61	291.08	794	0.366	3,566	17,858	0.638	11406.66
March	91.65	2.94	1.12	74.02	82.57	\$12.50	77.51	342.11	1,000	0.342	4,874	18,858	0.623	11748.77
April	16.91	2.65	12.82	70.76	68.42	12.50	69.58	253.64	1,040	0.244	4,169	19,898	0.603	12002.41
May	139.50	7.21		61.83	60.81	12.50	56.47	338.32	874	0.387	3,646	20,772	0.594	12340.73
June	27.51	8.48		71.92	63.48	12.50	60.84	244.73	999	0.245	3,844	21,771	0.578	12585.46
July	343.79	1.40		76.35	70.46	12.50	55.81	560.21	868	0.646	3,409	22,639	0.58	13145.67



Sanfort Fourteen-Passenger 'Bus

This 'bus body is being fitted as a standard body to the chassis made by the Sanfort Motor Truck Company, Syracuse, N. Y. The seats are upholstered in leather; it has dome lights, electric lights, electric push buttons, horn; body trimmed in mahogany finish and standard finish for the body is Brewster green. Windows can be opened readily, have straps and nickel handles, and all windows are equipped with anti-rattlers.

CARRIAGE CONCERN TO EMBARK IN THE MANUFACTURE OF TRUCKS AND PLEASURE CARS

Rock Hill Buggy Co., Rock Hill, S. C., which has been in the horse-drawn vehicle business for 30 years, is now manufacturing automobiles for both pleasure and business purposes. This part of the business will be conducted under the name of the Anderson Motor Co. J. A. Anglada, 1790 Broadway, New York City, has become chief engineer of the company, and is at present superintending the assembling of the sample cars. It is expected that 500 cars will be turned out the first season. The officers of the concern are: J. G. Anderson, president; C. J. Henry, secretary and treasurer, and J. W. Anderson, manager. The car will be known as the Anderson.

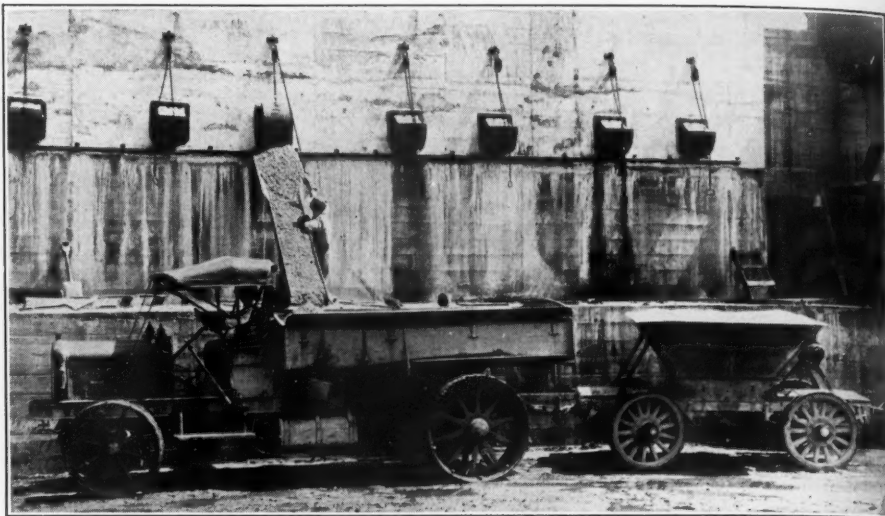
Packard Motor Car Co., Detroit, since it first placed Packard trucks on the market about ten years ago, has sold nearly 8000 of them, at a valuation of nearly \$20,000,000. These are exclusive of the trucks sold for export.

Commercial Car Efficiency Increased by Auxiliary Equipment

(Continued from page 15)

Handling Four Hundred Thousand Tons of Rock

When the Mill Creek sewer tunnel in the city of St. Louis was being built, Brocklehurst & Potter, contractors, purchased four White trucks for handling the rock. These machines were to haul from the excavation to a crusher, which they had planned to take care of the rock carried by the trucks. The work of course was to be completed within a specified time, and the trucks hauled night and day. It was soon found that the trucks had a capacity far in excess of that of the crusher, and in an accompanying illustration is shown a small mountain of excavated rock which in reality represents the excess capacity of the trucks over the



Up-To-Date Methods

This White truck and its trailer were used in the construction of the Mill Creek Sewer Tunnel, in St. Louis, together with three other similar outfits, loaded from the large concrete pockets and handled the rock expeditiously. Trucks and trailers were kept moving day and night.



Mountain of Rock Carried by Trucks

Four White trucks in use by Brocklehurst & Potter, in the Mill Creek Sewer tunnel in St. Louis, not only supply the large crusher up to its capacity, but in addition built up this small mountain of material which the crusher could not handle.

crusher. In another view is shown the large concrete overhead hoppers from which the material was shot into the trucks, also a dumping body trailer used in connection with the trucks.

Seven Hundred Foot Belt and Revolving Cone Assists in Package Handling

The American Express Co. in New York City, has a fleet of 450 trucks, one of the largest, if not the largest, in the Metropolitan District. These cars are of course used for the collection and delivery of packages.

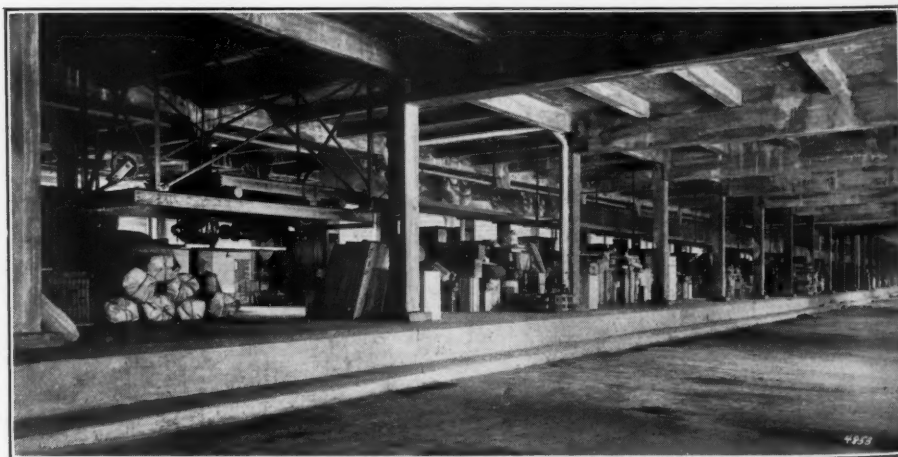
At the west side terminal at 10th Avenue and 33rd Street, there is a delivery platform the entire length of the building, within the building. Just above this plat-

form and raised sufficiently so that the men can walk under it, is the longest straight belt for the handling of goods that has ever come to the attention of the writer. This belt extends the entire length of the building, some 700 ft., is over 4 ft.



Elwell-Parker Electric Truck of the American Express Company

These industrial trucks handle the baggage in the large terminal warehouse at Thirty-third Street and Tenth Avenue, New York, one man operating and carrying loads which before, by hand trucks, would require at least four or five men.



Seven Hundred Foot Belt Used by American Express Company, for Distributing Packages

This is undoubtedly one of the longest straight belts in use. The electrical driving mechanism is shown at the one end on rollers, the whole mechanism being counterweighted to keep the belt under proper tension as it passes around the roll at the end which drives it. Goods are delivered from it at the further end to an inclined belt which carries the packages to the second floor, to the distributing cone.

The CCJ has most advertisers because it gives them biggest returns



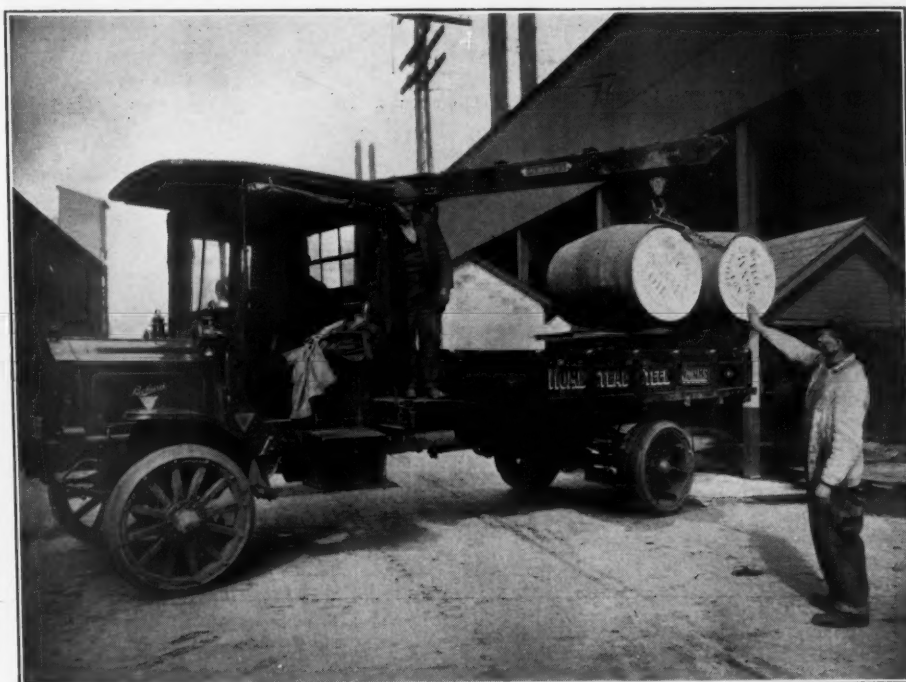
American Express Company's Trucks Delivering at Terminal

The trucks back against the curb, which stops them at the proper distance from the platform, which is of concrete. Goods gathered in the city and vicinity are discharged, and light packages which are to be mailed in trucks are thrown onto the overhead belt and thus conveyed the full length of the building, seven hundred feet, to the distributing room on the second floor.

in width with the side toward the trucks open to receive packages while at the back is a shield. The goods which the trucks bring in which are to be shipped by the express company by trunk are thrown by the drivers who unpack the collection trucks, directly on to this belt.

The Distributing Cone

At the delivery end the goods drop upon an inclined rubber belt which passes upward to the second floor at an angle which looks as though the packages would drop off, but the rubber belt holds them. This goes on toward the ceiling of the second floor assorting room, where a most unique distributing arrangement is provided. At the upper end the packages fall directly upon the point of a large hardwood revolving cone. The apex of this is padded to protect the packages from the 12 in. fall, and there is also a swinging padded



Packard Truck Fitted With One-Ton Jib Crane

This auxiliary loading device has a capacity of one ton, and is used for handling barrels of oil. It was installed on account of the "safety first" campaign, but was found to be a money saver



Unique Revolving Distributing Cone of the American Express Company

At the left is shown the cone during the day when not in use, while at the right is a night scene, showing sixty or more men surrounding the large cone upon which are handled over six thousand packages a night. The inclined belt at an angle of more than thirty degrees, receives the packages from the seven hundred foot belt, and delivers them at the second floor onto the padded apex of the revolving cone. The inner circle of men group the packages according to their destination, passing them down to the markers.

The CCJ leads in circulation, advertising and prestige

Auxiliary Devices as Used by Some of Buffalo's Motor Truck Users

By GEORGE W. GRUPP



IF the motor truck is to be a complete success, auxiliary devices must be considered indispensable. They must be considered such because the maximum efficiency cannot be otherwise obtained. A motor truck whose engine has to cough impatiently for an unnecessary period of time, which time might have been saved by such devices, is an unnecessary expense and a detriment to its success. And it has been the experience of all Buffalo truck owners, whether mentioned in this article or not, that auxiliary devices are as necessary as is oil and gasoline to the engine.

Empire Limestone Company

Plunging headlong into the subject the writer will cite the experience of a few

Buffalo concerns who have found them indispensable. For example, take the Empire Limestone Co. who own and operate three 5-ton Pierce Arrow trucks in their sand and gravel business. Originally, they employed men to shovel the sand and gravel onto the trucks. Under this system, it took four men, 10 minutes to load 3 cu. yds. of material. Since, they had their engineers design two large steel hoppers, whose capacity are 75 and 80 cu. yds. respectively. Each hopper is loaded by means of a bucket derrick which was formerly only used in the unloading of boats. This bucket derrick fills each hopper in 20 minutes and is operated by one man. This same man, now, also helps in loading the trucks at the hoppers. With the aid of these hoppers a truck may be loaded with 3 cu. yds. of material in 1 minute. In short

they have found that these two hoppers are able to replace the service of three men and save 9 minutes of time per load. Also, that this system has made it possible for them to replace ten horses, triple their delivery capacity, and make twenty-five deliveries a day with their three trucks. All told they are saving each day, 225 minutes or 3 hours and 45 minutes of time, and \$6 in wages.

Spaulding & Spaulding

Spaulding & Spaulding the largest retail and wholesale coal dealers in Buffalo, and who operate a large fleet of Pierce Arrow trucks, have had an interesting experience with their 7½ h.p. Link Belt Coal Conveyor which is operated by electricity. In the past, to load a truck with 5 tons of coal, it took three men and a foreman 20 minutes,



Empire Limestone Company's Hopper

The view to the left shows the bucket derrick which loads the hopper. The view at the right shows a closer view of the seventy-five cubic yard hopper, from which the trucks are loaded



Spaulding's Link-Belt Coal Conveyor

This affair is fitted on a truck and may be moved about from place to place as required. The conveyor is operated by electricity and loads the coal directly into the trucks

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers



Firestone

Hard Base Removable Tire

Tire Protection

NOTE from illustration how carefully Firestone engineers have designed their removable motor tire. No side swipes can affect the rubber. Note, also, that the heavy steel protecting channel takes nothing away from the volume of wearable rubber, but rather acts as an alarm when tires have worn down so far they will not properly protect the delicate truck mechanisms, which is the only reason for equipping the wheels with rubber.

Firestone S. A. E. Removable Tires assure continuous, efficient service. There is a Firestone Tire for every road, load and condition of service. Call the nearest Firestone Service Station for details and prices.

Firestone Tire and Rubber Co.

"America's Largest Exclusive Tire and Rim Makers"

Akron, Ohio—Branches and Dealers Everywhere

but now with this conveyor they are able to dispense with the services of the three men and load a truck with the same tonnage in 6 minutes. In other words they have been able to save 14 minutes on each 5 tons of coal loaded and \$6 a day for wages. The foreman now turns on the current and the conveyor loads the trucks automatically.

A. Schreiber Brewing Company

The A. Schreiber Brewing Co., one of the largest brewers in this city, and who operate a number of motor trucks, and bottle 27,000 bottles of beer in a seven and a half hour day, find their devices very beneficial.

Their system is as follows: After the bottles are filled and sealed they are carried on a steel belt conveyor to men who label them. At each labeling machine stacks of empty cases may be found. And as each case is filled it is placed on a steel roll conveyor, which by gravity, carries it to the opposite side of the labeling machine where it is picked up by a man who places them on small loading platforms. When the platforms are loaded, a lift platform truck is brought into play. On this the loaded platforms are carried to the motor truck loading platform. And as soon as the trucks

are backed up against this platform, the cases are then carried onto the trucks by means of a portable roll conveyor. This system as outlined has replaced two men handling hand trucks. It has also, made it possible for them to load their trucks with 700 two-dozen cases of beer, with four men, in 35 minutes, which under their old system would have required twice as long and additional help. In brief they are saving \$4

a day in wages and their trucks are loaded a great deal more quickly.

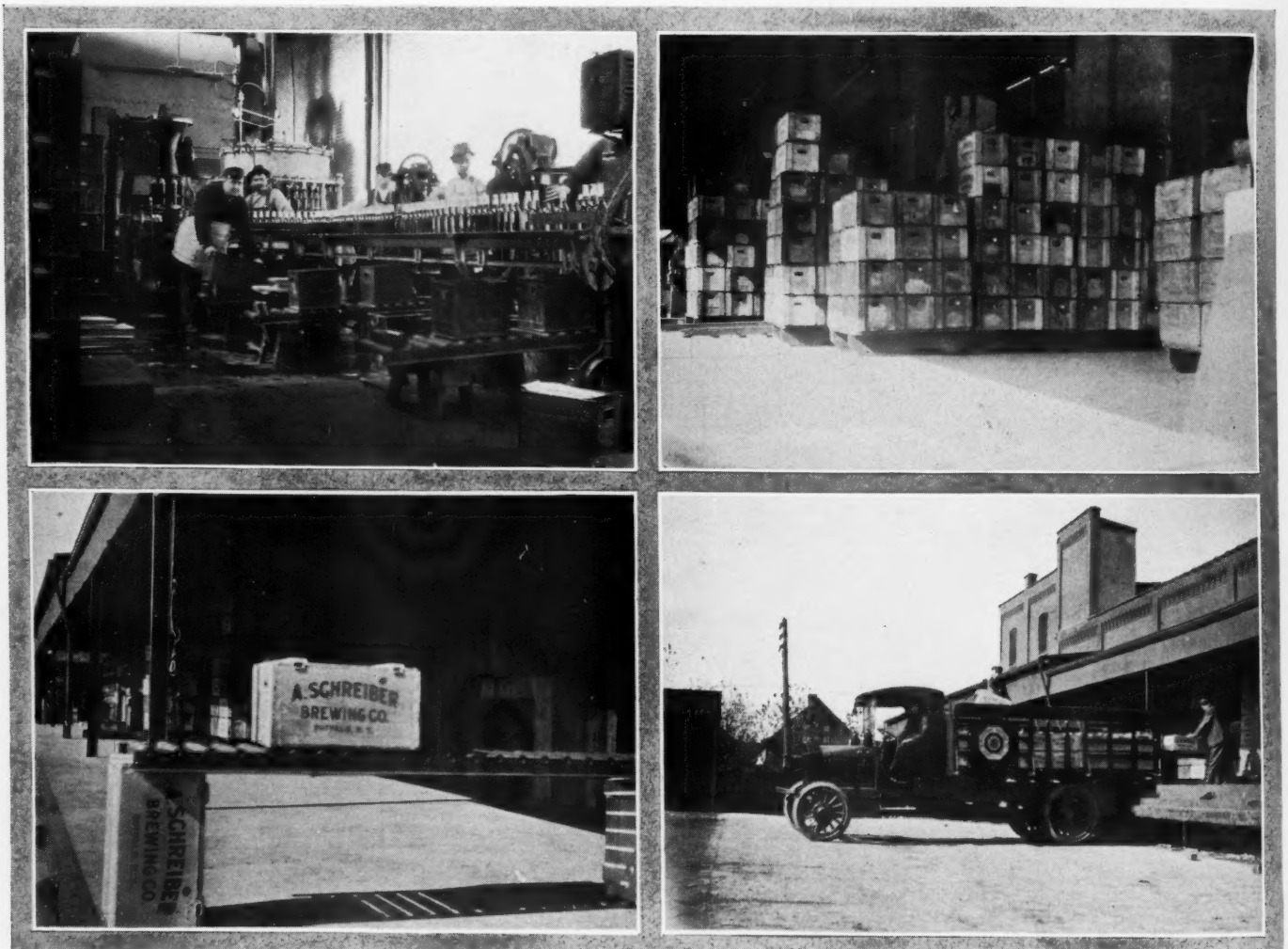
Therefore it can be seen from the foregoing statements that auxiliary devices must be installed if the motor truck is to be a real dividend producer.

The Columbus Postoffice is now using seventeen motor trucks in the transfer of the mails to and from the railroad depots of the city.



Truck With Trailer Used as Hay Wagon

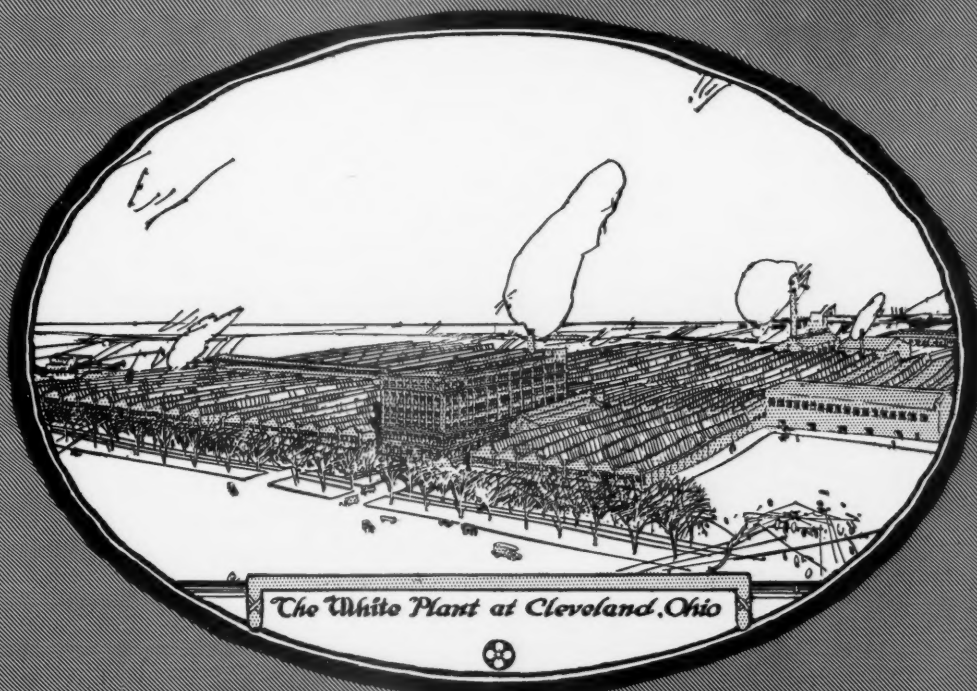
On a farm near Red Bank, N. J., a stake-body Federal truck is used, together with an ordinary wagon as a trailer, for handling the hay. The truck, under these conditions, carries about two and three-quarter tons and the trailer two tons. The combination is driven over the fields.



Views of A. Schreiber Brewing Company's Bottling Department

Note how the bottles after being filled and sealed are carried on a steel belt to the labeling machines, after which they are placed in cases which in turn are carried by gravity on roller conveyors out of the way, or on the opposite side of the machine. Here a man, as seen in the picture, carries them away onto a platform, a portion of which is shown. These cases are then brought out on the platforms on which they are resting, by lift trucks. The lower left view shows how the cases are rolled from the loading platform to the truck. The lower right view shows one of the Pierce-Arrow trucks as it is being loaded. Note how the cases are rolled from the loading platform to the truck.

The CCJ has most advertisers because it gives them biggest returns



White Trucks

Both in Quantity and Value of Production the Largest Manufacturers of Commercial Motor Vehicles in America

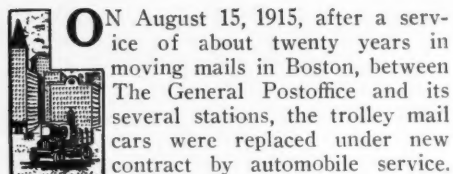
White Trucks received the ONLY GRAND PRIZE for motor trucks at the Panama-Pacific International Exposition

THE WHITE COMPANY
CLEVELAND



The Motor Truck Replaces Trolley Mail Cars in Boston, Massachusetts

By J. J. SULLIVAN



ON August 15, 1915, after a service of about twenty years in moving mails in Boston, between The General Postoffice and its several stations, the trolley mail cars were replaced under new contract by automobile service.

At the time of the expiration of the old contract there were nine of these cars in operation. The cars were used exclusively for mail purposes and fitted up for the distribution of mail in transit, between General Postoffice and stations, and make up mails collected from stations for outgoing mail trains. Some of the cars delivered outgoing mail direct at railroad stations, others to the General Postoffice for transfer by wagon.

Cost of Trolley Service

The Government paid for the trolley service at the rate of \$.16 a mile, and the cost for the nine cars was a little over \$49,000 a year. In addition to this and in connection with the trolley service there was a large additional cost for wagon service, to transfer the mail from the cars to the door of the several stations, the cars unloading at the regular street car tracks. This transfer was also necessary at the General Postoffice and at the railroad stations, thus losing considerable time and causing additional handling of large quantities of mail.

The new contract started with fifteen G. V. Electric Trucks, thirteen 1½ tons, and two 1500-lb. trucks.

The trucks are all fitted with iron-clad Exide batteries, and the arrangements for keeping the cars in continuous operation are very complete and up to date.

The trucks are garaged at the Edison Electric Garage in connection with one of the large stations of the Boston Edison Co., and located on Atlantic Ave., about three minutes from South Station, N. Y. N. H.

& H. R. R. station and about five minutes from postoffice.

Methods of Charging

The trucks are run to the garage, between trips and new batteries, fully charged, replace in a short time batteries removed. At times when the cars have a wait at South Station they are run into the garage and given a boost of thirty minutes, as this eliminates the changing of the batteries during a short wait. One of the cars has been showing a mileage of forty-nine miles on one charge, with a good reserve supply when run into the garage. This is a very good showing when it is considered that cars are under load going and returning on some trips.

Routes

Eleven of the 1½-ton trucks are used in transferring the mails between the General Postoffice and the twenty-five stations served under the new contract.

The two 1500-lb. trucks and another smaller truck of different make, put on since the new service was inaugurated, are used in the collecting of package boxes and other collection service.

The two additional 1½-ton trucks are held in reserve for emergency purposes, to insure an uninterrupted service.

The routes for the trucks are made up into circuits, there being five day circuits to cover all stations, starting from the General Postoffice, with one exception, early in the morning calling at the railroad stations, picking up the mail from the incoming mail trains and delivering the mail at the stations in time for first carrier delivery.

There are two night circuits, one leaving the General Postoffice at 12.15 a.m., covering ten stations and returning at 2.40 a.m.

The other night circuit leaves postoffice at 1.45 a.m., covering fifteen stations and return at 4.20 a.m.

The day circuits are: Back-Bay to Roxbury; Cambridge to Somerville; Brighton to Brookline; Charlestown to North Station; South Boston to Dorchester.

These circuits cover all the twenty-five stations included in the contract and make from sixteen to eighteen trips a day.

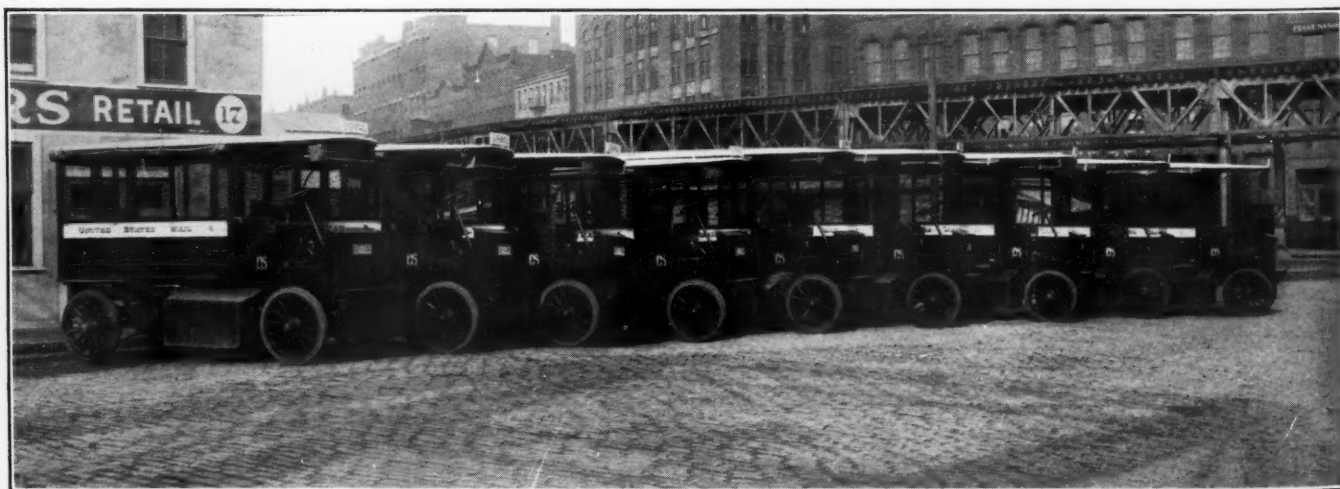
The cost of the auto service under the new contract is \$47,960, and the difference between this and the cost of the trolley service represents but a small part of the saving to the Government, due to the before-mentioned wagon service, which meant a larger number of additional contracts, one contract alone costing \$10,000. The postmaster estimated that the new service would result in a saving to the Government of from \$40,000 to \$50,000 a year. Twenty-one clerks being employed on the trolley cars—quite a saving in salaries.

The Superintendent of Mails, at Boston, says that a very much improved service will result under the new contract, and because of the fact that the automobiles deliver the mail direct at the door of the stations and shorter running time, it will more than make up for time saved in the distribution of mail in the trolley cars.

Four Wheel Drive Auto Co., Clintonville, Wis., has received an order for 500 trucks for the British Government at \$4000 each.

Illinois Garage, W. Monroe Street, Bloomington, Ill., will occupy one-story garage 38x115 ft. being erected at Washington and Madison Streets. C. W. Fry, owner of the Illinois Garage, has the agencies for the Oakland, Stearns-Knight, Buick and GMC trucks.

Continental Motor Mfg. Co., Detroit, has voted to declare a dividend of 100 per cent. on the common stock of the company. The common stock has been increased from \$1,500,000 to \$2,000,000; the authorized preferred stock is \$900,000, making the capitalization of the company \$2,900,000.



Electrics to Carry Boston's Mail

Part of the fleet of fifteen G.V. Electrics put in service in Boston on August 15, 1915, to replace trolley service. Regular U. S. Mail Bodies and Ironclad-Exide Batteries

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers